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UZBEKISTAN TRANSPORTATION

by S. M. Khodzhayev

- USSR -

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UZBEKISTAN TRANSPORTATION

- USSR -

[Following is the translation of a book by S. M. Khodzhayev, entitled Transport Uzbekistana, Tashkent, 1961, pages 1-212.]

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PREFACE

In the creation and development of Socialist industry and agriculture in Uzbekistan, a one-time backward agrarian-colonial Russian borderland, transportation has played a tremendous part. Each stage of Socialist construction in Uzbekistan is closely connected with transportation. In addition, the modern level of development of the productive forces of the Republic and the creation of a material-technical basis for Communism are unthinkable without well-organized transport. The economic literature of the republic contains significant monographic research on the economic structure of many branches of industry, agriculture, and culture, but works shedding light on the development of all types of transport in Uzbekistan, their modern development and future prospects, do not exist. This gap will be filled in to a great extent by this monograph. The present work deals with stages of the development of transport during the years of Soviet authority in Uzbekistan in close connection with the complex development of the republic's productive forces. We show the role played by transport in the changes which have taken place in the distribution of plants, as well as the development of transport itself. Studying the stages of development of t r a d e i n t h e republic, we have established the general laws for the development of transport, taking into consideration specific features of the republic. The technical reconstruction of transport and the construction of new railroads and highways, as well as an increase in the total length of waterways and airlines have determined the basic direction in the development of transport.

The present state of transport and its shortcomings have been sufficiently well shown. Analysis of the structure of freight hauling and the passenger transport, freight turnover dynamics, use indices for rolling stock and other interesting data on the present state of transport not only reflect the development of transport but can also be used for mobilizing transport reserves.

The central and most important section of the monograph is the chapter "Basic Trends in the Development of Transport", which points out the radical technical reorganization of transport and the construction of new railroads and highways, the extensive use of large-capacity fast jet aircraft, as well as the laying of gas mains. Here considerable space is taken up by the problem of new railroad construction both running from Uzbekistan to the European part of the USSR and Kazakhstan,

as well as within the republic itself. The solution of this problem, proceeding from interrayon and intrarayon transport-economic ties between the republic and other economic rayons, is a new one and will make it possible to carry out more accurate calculations. The tremendous capital investment directed toward the creation of a material-technical basis for Communism and the incorporation of new equipment in all branches of the economy, as is well known, has required the elaboration of the problem of the economic effectiveness of this investment in the economy. In this problem railroad transport cannot be an exception, on the contrary requiring determination of the economic effectiveness of capital investment in new railroad construction and new equipment. The attempt by the author to elaborate methods of determining the economic effectiveness of capital investment in new railroad construction, although it does not claim to be an exhaustive answer, nevertheless improves upon the existing method. The construction of new railroads in Uzbekistan (in Surkhandar'inskaya Oblast for farming the Karshinskaya Steppe, along the lower reaches of the Amu Dar'ya for working the Dzhumurtau Quarry and farming the Sultan-Uiz-Dag, in the Fergana Valley the laying of double tracks) meets the interest of the development of the economy of Uzbekistan. The reconstruction and construction of new highways and other man-made structures, and enlargement of small-scale truck depots, specialization in rolling stock, the development of motor vehicle repair bases, the extensive use of trailers and the centralized hauling of loads and many other problems brought up in this work are of great importance for cutting down motor vehicle transport expenditures for hauling freight in our economy. In recent years gas transfer has begun to develop extensively, making it possible to shift to gas industrial enterprises and utilities. The further development of gas transfer will not only lighten railroad, river and motor vehicle transport from hauling coal, but will also expand the economic ties of Uzbekistan. This work contains a number of moot questions on the further development of transport. We hope that the publication of this monograph will cause discussion among the scientific community, which will make it possible to solve these problems in a more detailed manner. The work contains a number of serious proposals for the further development of transport. Therefore it can be useful for planning organs of Gosplan, the sovnarkhoz, employees of a number of scientific research institutes, students and graduate students of the geographical faculty of Tashkent State University, Samarkand State University, pedagogical institutes and the transport organization and economics faculty of the Tashkent Transport Scientific Research Institute and practical economists working in the transport system.

Doctor of Economical Science, Professor A. M. Aminov

INTRODUCTION

All types of transport in the Soviet Union, including Uzbekistan, constitute a single communications network which is developing in a planned and symmetrical manner, according to a single economic plan. A close intercoordination between all types of transport, effected in the planned Socialist economy, makes it possible to utilize these means of communication most efficiently and to develop them in a comprehensive manner, correctly distributing loads among individual types of transport, carrying out in addition mixed hauls. The organizational activity of the Party and government at all stages of Socialist construction in the USSR, particularly in Uzbekistan, have made it possible to reconstruct transport in the republic in a radical manner. During the Soviet Five-Year plans, in the place of the broken-down and technically poorly equipped transport system inherited by the Soviet authorities from pre-revolutionary Turkestan, a modern railroad and water transport system was created in the republic, furnished with first-class equipment, and the formerly lacking highways, air routes, and gas lines were developed extensively. Transport constitutes an essential condition for effecting an efficient geographical division of labor, specialization and cooperation among enterprises, the securing of reliable and stable transport-economic ties between industry and agriculture, between various regions throughout the country. Transport has played an important part in the development of the productive forces of Uzbekistan. Constituting one of the basic constituents of the Socialist economic system, transport was an important factor in creating the material basis for Socialism in the republic and is playing an important part in creating the material-technical basis for Communism.

Transport does not create new material products. The transfer of cargoes and passengers, satisfying the needs of society, constitutes the product of transport. Lenin pointed out that "railroads constitute one of the manifestations of the close ties between city and village, between industry and agriculture, upon which Socialism is entirely based."[1] The Communist Party and Soviet government, proceeding from the instructions of Lenin on transport, have constantly focused attention on the problem of transport, which is one of the central problems in developing the national economy. The 21st Party Congress outlined the means for a

further development of transport in the USSR. In the control figures for 1959-1965 in the field of transport a radical technical reconstruction has been provided for the basic types of transport, particularly railroad and air. In 1959-1965 transport in Uzbekistan together with the entire economy will be raised to a new and higher level both in respect to supplying modern equipment and volume and quality of cargo transfers. As the new Party program indicates "The growth in the national economy will require an accelerated development of all types of transport. Extremely important tasks in the area of transport are the following: an expansion of transport-road construction and full satisfaction of the requirements of the national economy and the public for all types of transfers; further technical retooling of railroad and other types of transport; a significant increase in rates of speed on railroads, maritime and river waterways; the coordinated development of all types of transport as constituent parts of a single transport network." The further development of cotton, the gas, petroleum, chemical, power engineering, machine-building industry, building materials industry, farming new lands in the Central Fergana Valley, Eyeravshan, Karshinskaya Steppe, the rapid development of the public utilities and housing construction, light industry and the food industry require timely and regular delivery of freight from production points to consumer areas, presenting tremendous demands on the republic's transport capabilities.

The author takes on the job in this work of presenting the development of railroad, motor vehicle, river, air and gas line transport in Uzbekistan in various stages of Socialist construction, pointing up the significance of transport in the development of the economy, as well as exanmining problems of dealing with the development of transport within the Seven Year Plan. The book deals with technical progress in all types of transport in the republic and the problems of its further development, showing for the first time the correlation between various types of transport in transferring freight and passengers. In addition, we show the methods of determining the economic effectiveness of capital investment in new railroad construction. The present work constitutes the first part of a research project by the author in the problems of transport and economic ties in Uzbekistan. The second part will examine problems of economy in transport-economic ties in Uzbekistan. In the writing of this book, in addition to results of personal expeditionary research, the author has utilized materials from the archives of the Central State Archives of the Uzbek SSR, the materials from the Tashkent and Ashkhabad Railroads, the Mechanized Calculation Plant of the Tashkent Railroad, the Council for

studying productive forces in the republic of the Academy of Sciences Uzbek SSR, the Uzbek SSR Ministry of Highways and the Central Asia State Navigation Company, the Economics Institute of the Academy of Sciences Uzbek SSR, the Central Mechanized Calculation Plant of the Ministry of Communications, results of scientific research by the author, as well as statistical materials and articles from various journals. The author expresses his gratitude to colleagues from the "Economic Ties and Transport" sector of the economics institute of the academy of sciences Uzbek SSR, who were of aid in collecting the necessary materials.

CHAPTER ONE

TRANSPORT DURING THE REVOLUTION AND THE BEGINNING OF SOCIALIST TRANSFORMATION OF THE UZBEK ECONOMY (NOVEMBER 1917 - JUNE 1918)

The new Soviet state inherited from pre-revolutionary Turkestan a broken-down and technically imperfect transport system. Railroad transport had at its disposal insignificant reserves of rolling stock. Railroad lines, locomotives and railroad cars as well as other equipment, signal systems and communications were at a low technical level. Railroad open lines passed 2-12 pairs of trains every 24 hours,[2] the weight of which averaged 540 tons. Farm product cargoes were chiefly transported by railroads outweighing industrial products at that time. Loading and unloading were handled chiefly manually. The area of present-day Uzbekistan contained 1300 km of railroad lines, which meant 1.1 km for each 1000 square km. The area of Central Asia and Kazakhstan contain two railroads, one of which, which included the railroad lines from Krasnovodsk to Tashkent, including the Fergana Railroad, was called the Central Asian. A second line, including the Tashkent-Orenburg Railroad, although a large section of it passed through Kazakhstan, was called the Tashkent Railroad. Present-day Uzbekistan contains such privately owned railroads as the one built in 1906-1907 by the Amir of Bukhara, the Kagan-Bukhara spur, by the private company of the Fergana Road -- Kokand-Namangan (1911-1913), Namangan-Dzhalalabad (1916), by the private company Buchara Road-Kagan-Samsonova and Karshi-Kitab. In 1917 total inflow of freight by railroad to Uzbekistan was 1.7 million tons of cargo, and shipments out -- 1.1 million tons, which totalled 1.3 and 0.8% respectively of the total incoming and outgoing cargoes in the USSR.[3]

An important position in incoming freight shipments were such cargoes as coal (92,000 tons), petroleum products (78,000 tons), ferrous metals (97,000 tons), lumber (136,000 tons), grain (279,000 tons); for outgoing shipments -- cotton fiber, karakul, fruits, vegetable oil, cottonseed, petroleum and silk. Primary transport-economic ties by railroad were effected with the European part of the USSR, particularly with the central industrial region, with the Caucasus and the Urals, while the transport-economic ties between Uzbekistan and the Altai in Siberia were effected as formerly by caravan and cart roads. 1,745,400 tons of freight and 4,770,000 passengers were hauled by the Central Asian Railroad in

1913[4], totalling 722,600,000 ton-kilometers and 580,300,000 passenger-kilometers. Cargo transfer volume on the Central Asian Railroad before the Revolution is shown in Table 1.

It is apparent from Table 1 that freight shipments increased 74.4% between 1907 and 1913. An increase in freight shipments took place through the development of cotton raising and connected, contiguous branches of the economy. The primary use indices for rolling stock on the Central Asian Railroad in 1913 were characterized by the following figures: freight car turnover -- 7.2 days, load per car -- 6.8 tons, average daily locomotive run -- 125 km, average gross train weight -- 540 tons, commercial train movement speed -- 13.63 km/hr, train length -- 69 axles.[5]

The low utilization rate of rolling stock is explained by the poor material-technical basis of railroad transport, the lack of a clear-cut train movements schedule, insufficient coordination in the operation of two neighboring railroads, the lack of express trains, etc. Both in freight turnover and technical condition the Central Asian Railroad before the revolution occupied one of the lowest positions among Russian railroads. With its mileage totalling 5.6% of all railroads, freight turnover totalled only 1.2% of total Russian railroad freight turnover. Cargo shipments for short distances and even for several hundred kilometers were effected by wagon and mule-back, which was particularly important in areas distant from the railroad network. The lack of roads and the cutting up of dirt roads by numerous irrigation canals and aryk required large diameter wagon wheels. These large wheels made it possible for wagons to cross the irrigation ditches easily. Exploitation of waterways was effected by the military flotilla and the Khiva Corporation, as well as privately owned commercial vessels. The river fleet consisted of vessels which drew frequently more than the maximum, had little freight capacity and obsolete equipment. This hindered effective exploitation of the commercial fleet, since navigation conditions along the Amu-Dar'ya, due to the capricious nature of the channel, the shallow waters and rapid current are complex and unfavorable. On the Amu-Dar'ya, in addition to steamships, kime were used extensively. Barges were also used extensively. Ship movement along the river was limited to the daylight hours, while all vessels stopped at specific points for the night. By 1914 river transport totalled 1500 vessels with a total cargo capacity of 24,000 tons.[6] Pre-revolutionary Uzbekistan did not have any form of air or pipeline transport. The Great October Socialist Revolution opened up a new era in the history of mankind. The oppressed nations of Turkestan, receiving their freedom, began to build Socialism. Railroad workers participated actively in throwing over

Table 1*

Freight Shipments on the Central Asian Railroad Before the Revolution, 1000 tons

a Наименование грузов	1907 г.	1909 г.	1913 г.
b Пшеница	92,8	134,2	292,9
c Пшеничная мука	46,6	54,4	
d Рис	32,3	31,3	
e Сушеные фрукты	21,8	30,6	35,1
f Лес	54,6	49,4	128,1
g Дрова	56,2	54,5	
h Чай зеленый	7,5	12,3	14,0
i Мануфактура	33,7	27,2	30,0
j Масло хлопковое	8,6	17,2	36,7
k Нефть	23,9	21,4	92,2
l Керосин	26,0	36,7	
m Сахар	32,0	29,9	34,5
n Соль	17,7	20,9	23,4
o Хлопковые семена	62,6	91,7	405,4
p Хлопок	172,3	190,1	
q Шелк и коконы	1,6	2,1	2,5
r Шерсть	9,4	11,4	15,6
s Всего	1000,6	1126,2	1745,4

a -- Freight designation
b -- Wheat
c -- Wheat flour
d -- Rice
e -- Dried fruit
f -- Lumber
g -- Firewood
h -- Green tea
i -- Textiles
j -- Cotton oil
k -- Petroleum
l -- Kerosene
m -- Sugar
n -- Salt
o -- Cottonseed
p -- Cotton
q -- Silk and cocoons
r -- Wool
s -- Total

the henchmen of the Tsar in Turkestan and achieved regular operations of railroad transport. In April 1917 the first Congress of Delegates of the Soviet of Deputies of Employees, Foremen and Workers of the Central Asian Railroad was convened in Ashkhabad. The Congress worked out a program and charter for the Union of Workers of the Central Asian Railroad and adopted a declaration on its attitude toward the Temporary Government. After the Great October Socialist Revolution private ownership of the means of production was eliminated throughout the country. On privately owned railroad sections such as the Kokan-Namangan, Namangan-Dzhalalabad, worker authority was instituted, and in June 1918 they were nationalized. The nationalization of the greatly fragmented merchant fleet was executed in 1918 and 1919. By the Revolution Uzbek transport was in a state of collapse. Immediately after the imperialist war foreign intervention and civil war began (1918-1920). During this period the national economy of Uzbekistan and railroad, water and wagon transport in particular suffered greatly. The railroads were destroyed by special plow mechanisms and transformed into /arbyanoy/ line; stations, formerly centers of military operations primarily, were transformed by artillery fire into heaps of ruins, bridges were detonated, freight cars and locomotives were destroyed. The railroad sections Kagan-Samsonovo, Kokand-Namangan, Namangan-Dzhalalabad, and Karshi-Kitab were damaged particularly heavily. As a result of damage caused by bourgeois agents, labor discipline on the railroads was shaken, and traffic was stopped completely in certain areas. In order to secure the execution of essential cargo transfers, extraordinary measures were adopted. In January 1918 martial law was instituted on the railroads of Central Asia, and the Regional Administration of Turkestan means of communication was reorganized into the Military administration of Turkestan Railroads, with a military council. At the end of 1918, under the signature of Lenin, a decree was issued by the RSFSR labor and defense council for regulating railroad operations, prohibiting interference in the operations of railroads by outside organizations, eliminating delays in moving military-food shipments, forestalling the dastardly destruction of trains. In order to strengthen transport administration, the Party sent Communists in the capacity of commissars. However the situation in the transport network remained extremely tense. In 1919 the Central Asian Railroad was faced by the threat of complete traffic shutdown, since Central Asia was cut off from Russia from December of 1918 through October of 1919. The influx of food shipments from the grain regions of Russia was curtailed significantly. After the whites seized the Ukraine, the Don and the Caucasus, sources

of fuel supply for Central Asia were cut off, and a fuel crisis ensued. Locomotive fire boxes, due to a lack of coal and petroleum received saksaul, cottonseed oil and dried fish. Railroad freight turnover in 1919-1920 totalled 40% of the pre-war level. When the industry of the central area of Russia was badly in need of raw materials, on 1 January 1919 545,000 tons of cotton fibre, 96,000 tons of raw cotton, and 9,600 tons of cottonseed oil, etc., had amassed at state warehouses in Turkestan. Lenin devoted tremendous attention to the restoration of railroad ties with Turkestan, since this was of vital significance. Restorative work on the railroads was carried out not only by communications organs, but also by military units. On 16 September 1919 the commander of the Turkestan front, M. V. Frunze, telegraphed Lenin the following: "The destruction carried out against railroad transport between Orenburg-Aktyubinsk requires tremendous efforts. 110 bridges alone have been destroyed. We need for the rapid restoration of communications, the organization of production simultaneously in several sectors." Less than a month later, on 11 October Frunze reported to Lenin: "A month of vigorous work to restore the Orenburg-Aktyubinsk Line was completed on the 8th day of this month. More than 100 bridges have been repaired and restored. On the 9th of this month at 13 hours two-way traffic was begun between Orenburg and Tashkent. The first trainload of cotton arrived at Orenburg station from Turkestan."[8]

Railroad equipment in Central Asia during the Civil War years went to the dogs; the number of locomotives and cars out of commission increased. Ties along the lines were unsuitable and they required immediate replacement. During the Civil War the amount of rolling stock on the Central Asian railroads decreased greatly. No fewer difficulties were experienced during this period by vehicle transport. Military caravans had broken down the bed of dirt roads, and wooden bridges had been broken up for fuel. For example, on the Andizhan-Osh-Orkeshtam road almost all stone and brick bridges were destroyed, and wooden bridges had been burned and stolen, while the roadbed was completely ruined. During the Civil war water transport suffered tremendous losses. In his appeal to the Tashkent executive committee and railroad workers of Turkestan, Lenin soon after the Anschluss of Soviet Turkestan to Soviet Russia[9] pointed out the necessity of repairing rolling stock. For continuous supply to the Red Army and an early rout of the counterrevolutionary forces mass labor enthusiasm was necessary, and this found real expression in Communist day-off labor volunteers.

The first "transport week" was held in April 1920. On 25 April the railroad employees of Samarkand Station, in view of "Transport Week" worked three hours overtime. They

repaired three railroad bridges, 27 locomotives and 61 cars. In Novaya Bukhara 100 cars and several locomotives were repaired. In the city of Turkestan -- 8 locomotives and 21 cars. During "Transport Week" 12,664 workers, employees, and Red Army men worked in the Turkestan ASSR on the railroad. During this period 99 locomotives and 182 cars were repaired. On 21 October 1920 "Repair Week" was inaugurated. On 24 October "Repair Week" was held on the Tashkent Junction, with the participation of 5,000 workers. The opening of station and track number 127 is proof of the great success of this undertaking. Transport week and repair week played a very definite part in the restoration of railroad facilities of the republic and in increasing labor productivity of railroad workers. Suffice it to say that the workers of the Central Asian shops in October 1920 repaired 10 locomotives instead of 6 as scheduled.[10] During the Civil war and the Basmatch Rebellion the Central Asian Railroads played an important part in transferring troops from one front to another, in hauling munitions and war equipment, food and other necessary goods, speeding up victory over the enemy. During this period an important role was played by water transport in the war against the whites on the Khiva and Aral fronts, with the Basmatches in Eastern Bukhara; it had a decisive significance for the outcome of combat operations; the seige of the cities of Turtkul', Kerki and Chardzhou was broken by the successful operations of vessels, and one of the steamships of the Amu-Dar'ya flotilla was awarded the order of the Fighting Red Banner.[11]

The introduction of the New Economic Policy in 1921 coincided with the influx to the republic of Turkestan of numerous cooperative and state institutions and private individuals endeavoring to buy grain at Turkestan markets. During the years of foreign intervention and the Basmatch Rebellion freight shipments to Orenburg were cut sharply, while in the direction of Krasnovodsk they were cut to a smaller degree (Table 2).

Table 2*

Freight Shipments Through the Port of Krasnovodsk, 1000 tons

Year	Total Freight Turnover	Including			
		Fuel Imports	Cotton Exports	Grain Import	Grain Export
1914	572.5	206.4	96.0	53.5	9.5
1918-2nd half	51.2	39.3	3.5	1.5	0.5
1919	32.1	9.5	3.5	0.3	1.2
1920	181.7	153	12	1.4	0.2
1921	336.1	267.4	29.8	0.2	2.3

*Statisticheskiy Yezhegodnik (Statistical Yearbook) Part 1, Tashkent, 1924.

Total freight turnover of the port of Krasnovodsk in the period under consideration was 58% of the 1914 level. Due to a decrease in area under cotton, cotton fiber export in 1921 was 31% of the 1914 level, and fuel imports in 1921 were 30% more than in 1914. This is explained by the fact that after the fuel crisis industry, the railroad and the general public were in need of fuel. After the termination of the Civil War the problem of economic restoration, first of all railroad transport, rose to full stature. Lenin, at First All-Union Congress of Transport Workers said: "We need to restore agricultural and industrial turnover, and we need material support to restore it... This support will be furnished by railroad and water transport."[12]

The basic means for the restoration and development of transport were indicated in the GOELRO Plan. In August 1920 a meeting was held at the Tashkent railroad junction, at which Frunze spoke. He told of the defeat of the interventionists and appealed to the railroad workers for a rapid restoration of transport. In November of that year a repair train was assembled in Fergana consisting of 20 persons. The railroad workers forming the brigade were of a number of professions necessary for repairing locomotives. The repair train was assigned to the best shop of Andizhan Station. The brigade worked selflessly and repaired two locomotives every three days. After operations were back to normal on the Fergana branch, the repair train was sent to the Trans-Caspian Railroad (1921). In spite of the difficult financial situation of the Soviet Union, in 1922 the restoration of destroyed railroad lines began: Kokand-Namangan, Namangan-Dzhalalabad, Karshi-Guzar-Kitab, Kagan-Samsonovo-Termez, Andizhan II-Kokankishlak (Ten'tyaksay), Fedchenko-Sharikhan, Chinabad-Andizhan I, etc.

Along with the restoration of damaged lines construction began on the new Termez-Dzharkurgan-Surkhan branch, which was the first section of a railroad line goint to the capital of the Tadzhik Republic, the city of Dyushambye, a by-pass track for freight to Fergana was built at Ur'atyevskaya Station, as well as for cotton export to the central regions of the Soviet Union, and a railroad spur line was built from Termez station to a landing on the Amu-Dar'ya, facilitating freight transfer to water transport and, finally, the Skobelevo-Kuvasay spur line was built. During the period of restoration much work was done for the repair of worn-out rolling stock. In 1922 the number of locomotives out of commission was 33%, passenger cars -- 30% and freight cars -- 52%, while by 1927 we had 25%, 12% and 12% respectively.[13]

At the end of 1921 transport in the Turkestan ASSR was developing simultaneously with the economy. Plants, factories and workshops which had been destroyed, as well as agriculture,

were gradually restored and product output increased. The railroads during the period of restoration and the beginning of socialist reconstruction of the economy in the republic (1921-1927) were to satisfy the requirements of the economy for freight shipments. Therefore the Party and government devoted much attention not only to the restoration of transport but also to new equipment. During this period railroad transport received new locomotives, cars, ties and rails. This made it possible to keep pace with increased freight turnover. The Central Asian Railroads in 1926-1927 improved the ton-kilometer figures of the 1913 level by 46.1%.[14] The increase in freight turnover was accompanied by an improvement in the utilization of rolling stock. We should note particularly an increase in daily locomotive runs from 125 km to 170 km. During the period under study intraregional shipments increased particularly (Table 3).

It is apparent from Table 3 that the Central Asian Railroad handled chiefly local shipments. The main cargoes for the Central Asian railroad were the following: petroleum, grain, lumber, cotton, firewood, dried fruits, cottonseed and consumer goods. The national economy, which was in the process of restoration, required extremely rapid freight shipments. In order to cut down the shipment time main attention was devoted to an increase in the section (commercial) rate of train movement, for which a number of measures were taken: the technical condition of the roadbed was improved by laying new rails and ties, regular trains were put into service and the number of assembled trains was decreased, locomotive facilities were improved and a more powerful locomotive was put into operation than the series "O" locomotive -- the series "Shch" locomotive, and the number of stops at way-stations was decreased. In 1913 the commercial rate of train movement on the Central Asian railroad was 16.63 km/hr, on the Tashkent -- 13.91 km/hr, while in 1926-27 they totalled 15.5 and 16.5 km/hr respectively. In 1913 the weight of a train on the Central Asian Railroad totalled 540 t and on the Tashkent -- 553 t, while in 1926-27 -- 650 and 700 t respectively. With an increase in train weight the number of axles per train increased (Table 4).

The average freight car load on the Central Asian Railroad during the period under study increased by 6% and on the Tashkent -- 3.4%. During the period of restoration, when many cars were being repaired (at the beginning of this period the percentage of cars out of commission was as much as 52%), freight car loads increased relatively, since new, progressive loading methods had not yet been worked out. An increase in the rate of train movement should have led to an increase in the average daily freight car run, but on the Central Asian

Table 3*

Freight Shipments on Commercial Trains by Type, %

	a Вид сообщения			
	местное b	вывоз c	ввоз d	транзит e
f Среднеазиатская железная дорога (1922/23 г.)	72,6	19,7	7,6	0,1
(1923/24 г.)	59,3	20,4	19,6	0,7
g Ташкентская железная дорога (1922/23 г.)	28,1	23,7	39,4	8,8
h То же 1928/24 г.	34,2	18,2	36,7	10,9

a -- Type, b -- Local, c -- Export, D -- import, e -- transit, f -- Central Asian Railroad, g -- Tashkent Railroad, h -- the same.

*Narodnoye Khozyaystvo Sredney Azii (The Economy of Central Asia), 1925, No 5, p. 136.

Table 4

Central Asian Railroad Operations Dynamics Improvement Indices*

a Показатель	b Среднеазиатская железная дорога				c Ташкентская железная дорога			
	годы							
	1913	1924/25	1925/26	1926/27	1913	1924/25	1925/26	1926/27
d Средняя нагрузка товарного вагона, т	6,9	7,2	7,2	7,3	7,4	7,6	7,68	7,68
e Среднесуточный пробег товарного вагона, км	100	93	95	100	122	124	125	125
f Оборот рабочего товарного вагона, в сутках	7,2	8,7	7,2	7,0	8,5	12,6	12,0	11,5
g Средняя дальность перевозки 1 т груза, км	414	500	500	500	714	939	850	870
h Среднесуточный пробег паровоза, км	125	120	135	170	118	133	140	140

*Central State Archives of the Uzbek SSR, folio I-9, op. 1, d. 66, 72. a -- Index, b -- Central Asian Railroad, c -- Tashkent Railroad, d -- Average Freight car load, tons, f -- Working freight car turnover, per day, g -- Average shipment distance per ton of freight, km, h -- Average daily locomotive run, km.

road it did not change, and on the Tashkent road increased by 1.02%. This is explained in the first place by the poor mechanization of loading and unloading operations, and in the second place by the absence of clear-cut planning of shipments, and in the third place by the lack of freight for a full train. The time of freight car turnover decreased on the Central Asian Railroad by 0.2 days and on the Tashkent -- by 3.0 days. The import of freight necessary for restoring the economy from remote regions constituted an important factor in the increase of average freight shipment distance. Formerly grain from Tadzhikistan was hauled to Bukhara, while at the end of the period under study it was hauled in from Siberia and other areas. An improvement in road condition and facilities was very important for insuring continuous freight and passenger transfer. The railroad lines consisted chiefly of IIIa and IVa type light rails and were placed on sand and gravel ballast. On the Central Asian Railroad, 18-lb rails totalled 20%, 21.6 lbs -- 18%, 22.5 lbs - 62%; on the Tashkent road[15] the IVa type rails weighing 22.5-lbs -- 96.4% and type IIIa weighing 22.5 lbs -- 3.6%. The rails were heavily worn and differed in length even on the same section, and this made it more difficult to increase the rate and passage of powerful locomotives. Increased freight turnover on the Central Asian Railroads required an increase in the carrying capacity of railroad lines. With this purpose in mind in 1924-1925 double track sections were opened, making it possible to increase the carrying capacity of the Tashkent railroad at 14% and of the Central Asian by 10%, but the carrying capacity of these roads was not large. In the period under study the actual amount of train movement on the railroads was low. For example on the Samarkand-Ursat'yevskaya section the actual amount of train movement totalled 9 pairs of trains, Chardzhou-Samarkand -- 7, Ursat'yevskaya-Kokand -- 7, Ursat'yevskaya-Tashkent -- 14, etc. On other railroad sections of secondary importance, the actual amount of train movement was even lower. For example, on the sections Karshi-Samsonovo -- 2.5, Karshi-Kitab -- 1, Samsonovo-Termez[16] -- 2.5 and Namangan-Andizhan -- 1 pair of trains per day.

A limited amount of train movement on the railroads, particularly in the southwest of Uzbekistan, is explained by the even lower level of development of productive forces. As the result of the building of railroads in Central Asia in desert and arid regions the restoration of water supply became quite important. Water pipelines were laid along the tracks to supply locomotives with water; sometimes two or three water tank cars were attached to the trains. During the period of restoration railroad freight turnover increased and by 1926-27 had exceeded the pre-war level, and operations had improved. Railroad transport had been restored. An

improvement in the standard of living, an expansion of the scale of production experience exchange, development of the network of worker schools increased the volume of passenger transfer, which increased 1.7 times between 1913 and 1928. It was also essential to secure the restoration and further development of the road system connecting the administrative regions of the republic with railroad stations and river landings, since many regions were 600 km and more from the closest railroad. In Central Asia as a whole and in Uzbekistan in particular the total length of first-class roads was insignificant. In 1920-21 first attempts were made to build roads. Military road construction detachments were organized, which restored the road system in the most important areas at the instructions of the commanders on the front. But they operated only for a short period of time. In 1922, a division was made between state and local roads. Administration of the former was assigned to the People's Commissariat of Railroads in the person of its local organ -- the district local transport administrations (Sazomes), and local roads were given over to executive committee, the former being maintained at the expense of the national budget and the latter -- the local budget. In 1922 the Turkestan local transport division was organized, and in 1924 a road-transport division of the Main Administration of Local Economy of the Uzbek SSR NKVD. Reorganization of road facilities and administration placed a cornerstone to the organizational forms and restoration of roads in Central Asia. Repair work, the restoration and widening of the roadbed made it possible to introduce motor vehicle traffic (Tashkent-Troitskaya, Fuzar-Dyushambe etc.). The repair of local roads made it possible to transform many cart roads and paths into motor vehicle, and the repair of paths -- into wagon roads. Under the Tsars the present territory of Uzbekistan contained 19,000 km of dirt roads, 200 km of which were gravel covered,[17] while in four years of Soviet authority roads increased to 700 km. In 1927 state roads totalled 1834 km. Man-made works were repaired and restored on the roads and about 3500 running meters of bridges were built. Many difficulties were involved in the restoration of the road network, the main one of which was the lack locally of building supplies and the high cost of shipping them from other areas of the country. Water transport was extremely important in the economy of the Amu-Dar'ya Basin, particularly along the lower reaches of the river. The only route along which communications were maintained with the Central Asian republics was by water, which also formed the shipment route for grain, kerosene, cotton, livestock products, petroleum and other cargoes. After the nationalization of the fleet (1918-1919) it was transferred in the course of

five years from one department to another. For its efficient utilization in August 1923 it was amalgamated into the Central Asian State Steamship Lines of the People's Commissariat of Railroads, providing service in the Sea of Aral, the Amu-Dar'ya, Issyk-Kul', and the Ili River. The river fleet of the Central Asian state steamship lines along the Amu-Dar'ya up to the middle of July 1926 consisted of old, pre-war steam vessels with obsolete machinery and non-steam operated vessels with comparatively low cargo capacity and deep draught. In the second half of the navigation season of 1926 three new steam vessels were put into operation. In 1927 total length of waterways increased by 827 km, totalling 2567 km. The fleet on the Amu-Dar'ya consisted chiefly of barges which had been in service for 5 to 15 years. During the Civil War and the Basmatch Rebellion many barges were destroyed, and construction was renewed in 1922. During the period of restoration a privately owned and state fleet operated on the Amu-Dar'ya. During the restoration period the situation improved on the sea of Aral. The bay of Aral became accessible to vessels, and a railroad spur line was run up to the bay, which facilitated freight operations in mixed railroad-water transport. On the Amu-Dar'ya navigation conditions were improved, and night navigation became possible in the delta. During the restoration period the Central Asian state steamship lines began to build new vessels and repair old. The fleet was increased with vessels from other areas of the country. By 1927 the number of vessels more than tripled, the total cargo capacity almost quadrupled, and that of the privately owned fleet decreased correspondingly [18] by almost double and by more than double. However, in total tonnage the privately owned fleet was still more important. This fleet consisted chiefly of barges which could sail all along the Amu-Dar'ya. This fleet, organized into barge artels[19], also led the state steamship lines in total cargo shipment volume.

State steamship lines accounted for only 10% of total freight turnover in water transport in 1913, while this figure increased to 39% in 1927. During this period the ratio of the privately owned fleet decreased from 90% to 61%. In passenger transfer the privately owned fleet remained far behind. During the restoration period the water transport fleet was not only restored but exceeded the pre-war level in a number of vessels. Addition of new vessels to the fleet, and the improved equipment and facilities along waterways made it possible to increase freight turnover gradually, although during the restoration period freight turnover totalled only 70% of the pre-war level.

Industry and agriculture during the restoration period

required rapid freight shipment. The then existing transport means could not satisfy the requirements of the economy. During the restoration period the truck appeared on the scene, and played a decisive role in short distance hauls. The great maneuverability of the truck opened up broad possibilities for its use in the economy. In addition, trucks, the speed of which was several times greater than that of wagons, made it possible to bring closer production and consumption, aiding with this an increase in the rate of social production growth. Trucks aided in boosting the economic activities of all peripheral areas, an increase in the standard of living of the workers of Uzbekistan.

The Moscow Automotive Society founded before the revolution by millionaire Ryabushinskiy started building a plant which was not completed. Three incomplete wings remained. The Soviet state received several dozen machine tools as a legacy from Tsarist Russia. During the restoration period automotive production began in the USSR. In 1920-1921 the workers of the MAS began producing automotive engines. The production of the first Soviet motor vehicles began in 1924. Between March and November 1924 the plant workers produced the first ten HMO-F-15 vehicles, which on 7 November participated in the worker demonstration on Red Square. In 1925 the plant produced about 100 of these vehicles. In 1925 in Yaroslavl' production began on the Ya-3 three-ton truck.

In 1924, at the very beginning of Soviet motor vehicle production, these began to appear in Uzbekistan; the influx of motor vehicles increased greatly in 1926. In 1923 the commercial-industrial incorporation Avtopromtorg was organized in the USSR, which sold motor vehicles, spare parts, tires and other accessories. In 1926 the Uzavtopromtorg corporation was organized in Uzbekistan. In 1924 the total number of motor vehicles in Uzbekistan was not large, while in 1927 the total number of trucks was 330.[20] The introduction of the motor vehicle into industry and agriculture in Uzbekistan instead of two and four-wheeled wagons sped up the rate of the restoration of the republic's economy. Operational direction over the restoration of the national economy, a growth in population mobility and an extensive exchange of industrial experience, a rise in the standard of living aided the coming together of industrial and farm regions. Of great importance for the solution of this task in Uzbekistan was the appearance of air transport in 1924, for the transfer of passengers, mail and baggage. During the first year of operations of air transport, airlines connected Tashkent with Alma-Ata, Bukhara with Khiva, Tash..uz, Termez, etc. In 1925 the number of passengers served by air almost tripled in comparison with 1924, and the volume of mail and baggage

transfer increased 2.2 times.[21] The rapidity of passenger transfer gave impetus to public demand for air transport. The Central Asian division of the USSR Civil Air Fleet (Dobrolet Society) during the period under study possessed few aircraft. In 1925-26 the division had at its disposal ten aircraft of the Yu-13 type and 17 BMV 185 HP aircraft.[22] The rapid development of air transport is apparent from the fact that in 1924 210 flights were made totalling 160,000 km, while in 1926 there was a total of 1,107 flights covering 507,000 km.[23] From the above we see that the restoration of industry and agriculture in the republic was accompanied by a restoration of transport, without which an improvement in the economy would have been unthinkable. Between 1917 and 1927 railroad transport and the road system not only were restored, but freight turnover exceeded the pre-war level. Although in the period under consideration the locomotives and railroad cars available were added to by new rolling stock and road facilities were reconstructed to a great extent, which made it possible to conduct improved operations, railroad transport required further reconstruction and development. The new truck transportation could not play a decisive role in the republic's economy in freight transfer, although the requirements of industry and agriculture for freight was high. The restoration of the economy on the one hand and the appearance of the automobile on the other constituted the basic cause for the gradual improvement of the road system. Although in the period under study river transport freight turnover did not reach the pre-war level, much work was done in the restoration of the fleet, particularly in the area of forcing the privately-owned fleet out of business. Air transport, appearing during the restoration period, aided in improving passenger service between the major administrative centers.

CHAPTER II

UZBEKISTAN TRANSPORT DURING THE PERIOD OF FORMATION OF THE ECONOMIC BASIS FOR SOCIALISM IN THE REPUBLIC (1928-1932)

Railroad transport. After the successful completion of restoration work a new stage began for the Soviet land as a whole and our republic in particular -- the industrialization of the economy. The industrialization plan was adopted by the Fourteenth Party Congress and became the fundamental program for the great undertakings of the Soviet people. An inseparable element of national industrialization was the reconstruction of railroad transport, since without the reconstruction and development of railroad transport it was impossible to ship the mass of varied industrial goods, establish firm ties between old industrial regions and new. Without the basis of an extensively developed and technically well-equipped transport system it is impossible to effect a rise in the productive forces of the national republics, industrial and agricultural development. The directives of the first Five Year Plan for the development of the economy in 1928-1932 provided, in accordance with the resolutions of the Fifteenth Party Congress, for the development of railroads, the reconstruction and efficient organization of operations. The Party and government, dealing with problems in the development of industry and agriculture in formerly backward areas, devoted much attention to the development of transport. Industry required that industrial goods be brought into the republic, and agriculture needed mineral fertilizers, farm implements, petroleum and grain products. In order to execute the national policy of the Party it was necessary to create a material basis for socialism in Uzbekistan. An extremely important condition for the formation of a material basis for socialism in our republic was the development of new branches both of heavy and light industry, an improvement in which required that large quantities of industrial goods be brought into the republic. During the first year of the five year plan the total amount of goods hauled into Uzbekistan was 2.4 million tons, and goods hauled out -- 1.6 million, that is 1.41 and 1.45 times the 1913 totals respectively. The arrival of freight by railroad transport into the Uzbek SSR in 1928 totalled 1.6% of total goods delivery for the USSR, and goods shipment -- 1.0%. In 1928

172,000 tons of coal were shipped to the republic, or 1.87 times that of 1913; 225,000 tons of petroleum products or 2.88 times, 297,000 tons of lumber or 2.18 times.[1]

During the first Five Year Plan the republic's developing industry required more goods than in the restoration period, and a large portion of production was used locally. During the first year of the first Five Year Plan freight turnover on the Central Asian railroad increased 143% over the 1913 level and totalled 1.56% of total USSR railroad freight turnover. Freight turnover on the Central Asian railroad increased chiefly due to an increase in industrial goods shipment. In 1928 coal shipments doubled, lumber -- tripled, petroleum products -- increased by 410% and building supplies -- 430% over 1913.[2]

For more efficient goods shipment, particularly of coal, it was essential to develop coal extraction in the republic and nearby coal beds, since during this period coal was hauled from the Donbass, Karaganda and other regions. This created overloads in transport operations. In order to cut down transport costs for hauling in coal from distant regions, to free railroad transport from long hauls, as well as for more efficient shipments of coal, during the first Five Year Plan several small railroad lines were built to coal beds; in 1928 -- Kuvasay-Kzylkiya, in 1932 -- Dzhalalabad-Kokyangak etc. These short railroad lines aided in exploiting new coal deposits and in cutting down the volume of coal hauled in. During this period the USSR was still importing cotton from abroad, although it had the capability of satisfying the country's requirements with domestic cotton. In view of the development of cotton farming in 1930 in the Fergana Valley construction was completed on the Assake-Sjarikhan and Karasu-Osh railroad sections. These small sections created the necessary conditions for hauling farm implements, mineral fertilizers and consumer goods into cotton farming regions and the shipment of cotton for the textile industry. For the development of cotton farming in the Uzbek SSR and other Central Asian republics of great importance was the linking of Central Asia with Siberia and the Altai by rail, for these latter areas were large grain producers and grew a surplus. Due to the absence of a railroad line joining these two economic regions up to 1931, only small amounts of Siberia grain reached Central Asia by a roundabout route through the Urals, which was extremely expensive, and grain shipment by road was almost impossible. Therefore large areas of the Uzbek Republic were in grain. The continual rise in the standard of living in the Uzbek SSR increased requirements for grain products, particularly for high-grade flour. In addition, Uzbekistan was and still

is a large consumer of lumber, great reserves of which are found in Siberia. In order to exploit the extremely rich regions of Siberia and supply Central Asia with cheap grain and lumber, as well as for the development of the productive forces of these regions, the Turkestan-Siberian railroad was built and put into operation in 1931 (now part of the Kazakh Railroad). This was the country's most extensive main line, built during the first Five Year Plan: Semipalatinsk-Alma Ata-Lugovaya.

The Turkestan-Siberian Railroad made it possible to exploit Siberia, and aided in the development of the economies of the Central Asian republics. Siberian grain and timber began to come to Central Asia along this line. By furnishing Uzbekistan with Siberian grain it was possible to cut down area in grain and utilize these lands for cotton and alfalfa. The extension of area under cotton and increase in productivity made it possible to increase the production of raw cotton and ship it by railroad; in 1932 cotton fiber shipments increased by 37%, raw cotton -- 60%, cottonseed meal -- 260%, vegetable oil -- 40% over 1928.

The socialist planned economy showed its superiority over the capitalist economic system also in the area of transportation. The Central Asian Railroad overtook leading capitalist countries in a number of rolling stock utilization indices. The average dynamic load per freight car axle[3] on the Central asian Railroad in 1930 totalled 5.68 tons, in the USA -- 5.7 t, in England -- 2.9 t, in Germany -- 5.5 t, in France -- 4.3 t, in Japan -- 3.8 t. In average daily freight car run, average length of passenger and freight trains the Central Asian road occupied one of the top positions not only for the Soviet Union but for the world as a whole. The development of cotton farming, extraction of local coal, development of new branches of industry, construction of irrigation facilities, reconstruction and development of railroad transport and the communal economy were decisive factors in increasing railroad freight turnover, the volume of which in 1932 was 78% greater than in 1928. Series E and Ye locomotives began to operate on the railroad. These were much more powerful than O locomotives[3] and new rolling stock was brought in and type IIa rails were laid instead of light-weight, and the number of permeated ties per kilometer of railroad line increased. The increase in freight turnover on the Central Asian railroad during the first five year plan is shown in Table 5.

In connection with the increase in cargo volume changes took place in the freight operations of the Central Asian Railroad in a directional respect. Freight movement along the Mel'inkovo-Kokand section during the first Five Year Plan almost doubled. This was due to an increase in cotton ship-

Table 5*

Central Asian Railroad Freight Turnover Dynamics, 1000 t.

	Наименование грузов	1928 г.	1932 г.	1932% к 1928 г.
a	Хлебные грузы	738,0	1101,7	149,2
b	Каменный уголь	162,4	639,9	390,2
c	Нефтепродукты	475,0	1181,3	248,1
d	Лесоматериалы	394,6	549,6	139,2
e	Стройматериалы	305,0	917,0	300,6
f	Хлопок-волокно	248,8	342,1	137,4
g	Хлопок-сырец	160,0	260,0	162,5
h	Жмых	44,0	158,1	359,0
i	Масло растительное	41,5	66,8	161,0
j	Прочие	1672,7	2998,7	143,4
k	Всего	4242,0	7559,2	178,2

*Zheleznyye Dorogi Sredney Azii (Railroads of Central Asia), p. 9.

a -- Grain
b -- Coal
c -- Petroleum products
d -- Lumber
e -- Building supplies
f -- Cotton fiber
g -- Raw Cotton
h -- Cottonseed meal
i -- Vegetable oil
j -- Other
k -- Total

ments from the Fergana Valley, shipment to the valley of mineral fertilizers, farm implements, kerosene, gasoline, building supplies and other goods, as well as the development of local coal extraction in the valley. Freight shipments along the Arys'-Tashkent Line greatly increased. In an even direction they increased by more than 150%, and in an odd -- almost doubled. This is explained by the fact that all shipments arriving in the Central Asian republics from other union republics and shipped from them pass along the Arys'-Tashkent Line and in the other direction. To a somewhat lesser extent freight shipments increased on the Ursat'yevskaya-Samarkand and Kagan-Karshi sections. The constantly increasing freight turnover required an increase in rolling stock on hand. In 1913 through 1931 the volume of cargo shipments increased 330%, while the number of freight cars increased 126% and the hauling capacity of available locomotives -- 65%. It is obvious from this that the increased freight turnover took place with an unproportional increase in locomotives and rolling stock, with a more efficient utilization of rolling stock, reconstruction and

addition of new cars and locomotives. Freight traffic toward Kinel', linking Central Asia with the European part of the USSR, increased 330% in shipments to Central Asia in 1931 in comparison with 1913, and 150% in comparison with 1928, and for outshipments 620% and almost 200% respectively.[5] New, powerful locomotives (series E and Ye) were brought in to cope with the increased freight turnover, and rails and ties were replaced in certain sections. The increase in the freight shipments required a lessening of the heavy profile of certain sections. In coping with the increased freight turnover an important role was played by an improvement in rolling stock utilization (Table 6). As is apparent from Table 6, rolling stock utilization in the period under study improved considerably. In coping with increased freight turnover of great importance was an increase of per axle load, since the same number of freight cars could carry a greater volume of shipments. Of great importance was an increase in the weight of trains, which made it possible to ship a greater volume of freight, increase the transport capacity of railroad lines, save on capital investment necessary for increasing their carrying capacity, decrease the number of trains assembled, etc. During the first Five Year Plan great changes also occurred in passenger transfers. They were caused by industrial, agricultural, transport, irrigation and other types of construction, the opening of new schools, expansion of production ties, as well as a rise in the standard of living of the people of Central Asia. Passenger transfers grew both within Central Asia and beyond its borders, both in local and direct communications. In 1932 the passenger transfer volume on the Central Asian Railroad totalled 13,555,000,000 passengers as against 3,050,000,000 passengers in 1928.

Analysis of passenger transfers shows that passenger transfers in direct service increase more rapidly than in local. This was aided, in addition to the above-mentioned factors, by the beginning of operations of the Turksib Railroad, which facilitated connections between Central Asia and Siberia, Kazakhstan, the Altai and other regions (Table 7).

Legend to Table 5 (which appears on page 24):

a -- Rolling stock use index
b -- Average freight train composition, axles
c -- Average freight train gross weight, tons
d -- Average dynamic per-axle loaded freight car load, tons
e -- Average daily freight car run, km
f -- Average passenger train composition, axles
g -- Freight car turnover, 24-hour period

Table 6*

Rolling Stock Use Improvement Dynamics

a Показатель использования подвижного состава	1928 г.	1930 г.	1931 г.
b Средний состав товарного поезда, осей	84	104	119
c Средний вес брутто товарного поезда, *т*	683	886	1090
d Среднединамическая нагрузка на ось груженого вагона, *т*	6,10	5,68	6,43
e Среднесуточный пробег товарного вагона, *км*	112	107,3	96,2
f Средний состав пассажирского поезда, осей	39	46	48
g Оборот грузового вагона, сутки	7,2	7,1	7,5

*Zheleznye Dorogi Sredney Azii, page 13

Table 7

Passenger Transfer Growth Dynamics by Type on Central Asian Railroad*

a Виды сообщений	1913 г.	1928 29 г.	1931 г.
b Прямое	668,0	625,7	1408,0
c в том числе;			
d прибытие	334,0	547,5	725,0
e транзит	св. нет.	св. нет	159,0
f отправление	334,0	78,2	524,0
g Местное	4102,0	6569,0	8830,0
h Пригородное	—	625,7	591,0
i Всего перевезено, тыс. пассажиров	4770,0	7821,0	10829,9

a -- Types of service
b -- Direct
c -- Of that
d -- Arrivals
e -- Transit
f -- Departures
g -- Local
h -- Commuter and suburban
i -- Total transfers, 1000 passengers

*Zheleznye Dorogi Sredney Azii, page 15.

Table 29

Mineral Fertilizers, Lumber and Petroleum Products Hauled In By Rail To the Lower Amu-Dar'ya in 1959, tons.

Районы отправления	Районы прибытия								
	КК АССР			Хорезмская область			Ташауэская область		
	минеральные удобрения	лес	нефтепродукты	минеральные удобрения	лес	нефтепродукты	минеральные удобрения	лес	нефтепродукты
Горьковская обл.	—	—	—	5 486	—	—	—	—	—
Пермская .	1 794	—	—	19 376	—	—	—	—	—
Московская .	—	—	—	5 953	—	—	—	—	—
Челябинская .	103	220	—	4 462	1 400	—	62	—	—
Оренбургская .	135	—	721	11 612	—	1 832	103	—	1 940
Актюбинская .	8220	—	—	52 831	—	—	10 045	—	—
Кемеровская .	2285	—	—	5 655	5576	—	11 723	400	—
Сталинская .	—	—	—	—	—	—	7 096	—	—
Алтайский край	—	359	—	—	1 358	—	—	1 044	—
Красноярский .	—	4 930	—	—	12 321	—	—	22 884	—
Иркутская обл.	—	36 727	—	—	57 210	—	—	41 774	—
Бурятская АССР	—	48 410	—	—	11 810	—	—	7 687	—
Свердловская обл.	—	43	—	—	577	—	—	450	—
Куйбышевская .	—	440	—	—	1091	—	—	—	—
Саратовская .	—	—	—	—	—	48	—	—	221
Башкирская АССР	—	234	137	—	686	237	—	—	291
Армянская ССР	—	—	43 304	—	—	166 042	—	—	66 910
Всего	12 765	53 545	45 239	112 010	120 453	169 880	38 895	94 322	70 899

(Legend on page 25)

It is apparent from Table 7 that in 1931 passenger transfers in direct service increased by 127% over 1913, including: passenger arrivals -- 117%, departures -- 57%. In absolute values passenger arrivals in direct service exceed departures in this category. This is explained by the influx of skilled industrial workers to Uzbekistan from other areas of the Soviet Union. Passenger transfers in local service increased by 110%. This is explained by an improvement in economic and cultural ties between various economic regions in the republic. The primary passenger train routes were to Dzhusaly-Arys'-Tashkent, Tashkent-Ursat'yevskaya, Ursat'-yevskaya-Andizhan, Kagan-Samarkand-Ursat'yevskaya. The frequency of passenger train movement also increased. Suffice it to say that on the Central Asian railroad it totalled 655,000 passengers per km in 1932 as against 252,000 passengers per km in 1928. We should note that passenger trains were quite heavily loaded, particularly on the Ursat'yevskaya-Kokand-Andizhan section.

At the end of the first Five Year Plan Uzbekistan had 1750 km of wide-gauge railroad, 2.1% of the total USSR railroad system. The length of railroad lines increased in comparison with 1913 by 450 km. The density of railroads per 100 km^2 in the Uzbek SSR in 1932 was 0.44 km. Such a low density level is explained by the fact that entire regions in the republic, such as Khorezmskaya Oblast and the Kara Kolpak ASSR did not have railroads at all and were far from the railroad system, a fact which had a negative influence on the development of the productive forces of these areas. In addition, even in the wealthiest areas of the republic -- Fergana Valley and Tashkentskaya Oblast, the railroad system was not sufficiently well-developed. During the years of the first Five Year Plan Uzbek railroad transport achieved great success. Freight and passenger turnover increased, freight operations improved, and the number of railroad cars increased. However, the increase in the hauling capacity of locomotives and the carrying capacity of railroad lines, as well as reconstruction of railroad lines lagged behind the rate of freight turnover growth. During the period of the creation of an economic foundation for socialism in the republic railroad transport aided an acceleration in the development of productive forces in Uzbekistan, provided the timely shipment of essential goods, coped with increased freight turnover and constituted one of the basic factors in the upswing in the Uzbek economy.

Roads and motor vehicle transport. The incorporation of the motor vehicle into industry and agriculture in Uzbekistan in the place of two and four-wheeled wagons with a speed of 8-10 km/hr and a cargo capacity of no more than one

ton, met the requirements of industrialization and collectivization in the republic. Industrialization and collectivization constituted the chief factors for an increase in industrial and agricultural goods transfers by rail. A shipment not delivered to the point of consumption is in the process of relocation. Karl Marx wrote that "a product is completed only in consumption".[6]

The successful industrialization and collectivization of agriculture depended to a great extent on the timely delivery of goods and regular motor vehicle transport operations. Naturally road transport facilities existing at that time could not be the connecting link between industrial centers and the peripheral areas, nor could a tremendous quantity of industrial and farm goods be hauled. The poor condition of dirt roads could not provide 24-hour service, and there were in addition high transport costs due to the low quality of the roads. For the successful industrialization and collectivization of the area, the Party and government in November 1928 adopted a special decree calling for the creation of a large-scale domestic automobile industry. The construction of motor vehicle plants began during the first Five Year Plan. In 1929-1931 the Moscow Motor Vehicle Plant was built on the site of the pre-Revolutionary plant, built to increase truck production. Soon, among other gigantic construction jobs during the first Five Year Plan, the Gor'kiy Motor Vehicle Plant, of an even greater capacity, was commissioned. Its products were the GAZ-AA truck and GAZ-A automobile. At the same time enterprises producing carburators, tools and parts for motor vehicles, standard specifications and accessories were built and reconstructed simultaneously. This lay a basis for the mass production of Soviet motor vehicles with the application of conveyer production methods. With the development of the automotive industry in the USSR the influx of motor vehicles to Uzbekistan increased sharply, and this provided an increase in truck hauling. In 1924 there were only a few trucks in the republic, and freight volume was low, while in 1932 there were 1,331 trucks, which hauled 1,735,000 tons of freight. The ratio of truck transport in goods shipment increased to 22.4% as against 6.4% in 1928.[7]

For activating truck transport, in November, 1928, on the basis of the Central Administration of Local Transport People's Commissariat of Railroads, the Central Administration of Roads and Motor Vehicle Transport was organized under the Sovnarkom USSR, and locally regional transportation administrations were reorganized into main road transport administrations. The Central administration and its organs were entrusted with the construction, repair and maintenance of roads, direction of truck freight shipments and passengers.

The rapid development of the branches of the economy required an intensified use of motor vehicles available in the republic. For this purpose a resolution was adopted in 1930 calling for the amalgamation of motor vehicle transport organizations and the organization on their basis of an All-Union Warehouse and Transport organization -- Soyuztrans, subordinate to the People's Commissariat of Railroads. This resolution formed the basis of organizing in the USSR and the Union Republics general use motor vehicle transportation. Being subordinate to the People's Commissariat, Soyuztrans handled chiefly freight for railroad stations, ports and landings and did not fulfill the needs of many branches of the economy. Therefore, soon after the organization of Soyuztrans a resolution was adopted to place it subordinate to Tsudortrans of the Sovnarkom USSR, since this time motor vehicle transport facilities of general use began independently to handle drayage jobs both within urban areas and between cities on the "door to door" principle. A great job in mobilizing resources for the Soviet automotive industry, the dissemination of knowledge in the field of motor vehicle use among the public and road improvement was done by the Avtodor[8] Society, a volunteer organization for cooperating road construction and the development of motor vehicle transport, set up in the republic on 6 February 1926.

With the development of motor vehicle transport, increase in speed and truck loads requirements for roads increased sharply. The strength of natural dirt roads was insufficient. The poor technical condition of the road network had a negative influence on motor vehicle transport use. Efficient operation of motor vehicle transport facilities is aided to a great degree by the good condition of roads. Natural dirt roads increase transport costs and do not provide year-round reliability. Dirt roads barred the passage of the necessary quantity of industrial goods for the collectivization of agriculture and for providing shipment of farm products to cities and industrial centers. For the efficient utilization of motor vehicle transport and in order to provide year-round truck passage on dirt roads jobs were systematically carried out for improving the road system. In 1930 the Tashkent-Leninabad section was built on the Tashkent-Muratali span, and in 1932 the Bukhara-Kzyltepe Road was built. In 1932 improved dirt roads appeared, and the total mileage of gravel roads increased. This year the road system totalled 21,600 km. Natural dirt roads accounted for 20,800 km, improved roads -- 300 km, gravel roads[9] -- 500 km. This naturally was insufficient for providing Uzbekistan with hard surface roads.

During the first Five Year Plan the automotive industry could not immediately fully supply the economy with motor vehicles, and therefore during the period under study foreign

trucks were used alongside Soviet, the foreign trucks totalling 9.2% of all vehicles in the republic. In this period the Soviet Union could not eliminate the importation of industrial equipment in general and buses in particular. The development of industry and agriculture, expanding and flourishing economic ties between city and country increased bus service. In order to supply the requirements of the public for bus service, chiefly in large cities, foreign buses were used. In large cities (Tashkent, Samarkand, Bukhara, etc.) 92 Ford, Reno and other buses were used. The Ford had a 14-person seating capacity, the Reno -- 24, the Steier -- 12, AMO-24 -- 14. The results of using foreign buses demonstrated the uneconomical nature of these vehicles. The Soviet Union could not remain dependent for years at a time on capitalist countries for motor vehicle imports. The creation of the country's first metallurgical base in the Ukraine and the Urals-Kuzbass Metallurgical Bases during the pre-war period sharply improved the supply of high quality metal to the Soviet automotive industry. During the First Five Year Plan our automotive industry produced buses of various makes: in 1929 -- Ya-6, in 1933 the AMO-4. The production of comfortable and economical motor vehicles put an end to the importation of vehicles from abroad. The higher rate of truck output in comparison with automobile is explained by the industrialization and collectivization of the country. In addition, truck transport played an important role in expanding and strengthening the economic ties between industry and agriculture.

Water transport. As is well known, in Uzbekistan, although there are many rivers, navigation was limited chiefly to the Amu-Dar'ya and Sea of Aral. The conditions on the Amu-Dar'ya differ greatly from the rivers of the European part of the USSR and Siberia. The beginning of navigation (March) is characterized by shallow water and heavy silting of the channel. Beginning in April, with the melting of snows in the Pamirs and other mountain ranges feeding the Amu-Dar'ya and its tributaries, the water level rises, and the current rate increases, the influence of these becoming apparent as early as May in ship movement upstream. Maximum water levels and current are observed in July. In the beginning of August an intensive drop in water is observed, which continues in September. At the end of navigation (November) the rivers once again become shallow. During the entire navigation season the current changes: in March and April -- the spring low water period -- it averages 4-5 km/hr. In May-June -- 6-7 km/hr, in July-August -- the maximum period -- 8-10 km/hr. We should note that in the narrowest places, such as under the Chardzhuyskiy Bridge and in

Tuyamuyune and in certain other areas, the current reaches 12 and even 14 km/hr. As a result of the wandering river the dynamic axis of the current sometimes changes its position several times, which causes heavy erosion to the banks. September is characterized by a further drop in the water horizon and flow rate (averages 6-7 km/hr), in October-November the flow rate drops to 5-6 km/hr, and the bed during this period is relatively stable.

During the entire year, particularly in the high water period, the water is unusually murky, and the quantity of suspended particles is large. The river current, particularly in the high water period, is extremely erratic, with several channels and corresponding dynamic axes, constantly splitting and coming together. The river slopes in a longitudinal and transverse direction change constantly, forming an entire system of rocks, bars, whirlpools with characteristic holes, causing rising and dropping currents, particularly noticeable due to the different colorings and degrees of murkiness in various streams[11]. Extremely characteristic for the Amu-Dar'ya are the shallows, called Takyr, which are dangerous to navigation. Deep spots are usually found next to the Takyr. Characteristic for other rivers is the alternation between comparatively long, calm and deep sections with slow current and slight slopes of so-called reaches and short shallow water sections with steep slopes and rapid current of so-called shoals. The Amu-Dar'ya does not have this (perhaps with the exception of part of the delta area where the river is comparatively calm). Almost everywhere the Amu-Dar'ya is one solid rift. The instability of the nature of the river bed is unprecedented. Islands, underwater shoals and deep holes appear and then disappear during the course of several hours, frequently deviations of the river axis occur to one side or the other without any apparent reason. This instability and changeableness of the bed is called "river wandering". Under these conditions the channel is determined in each specific case by the experienced eye of the pilot according to the river current and change in its color and shades. The rapid and strong river current (the Amu-Dar'ya standard water level is about 1.5 m/sec, and during high water -- up to 3m/sec) breaks down rocks, tearing away fine particles and carrying them along. The inconsistency of the channel, the changeability of the bed, and the sharp alternation in depth make it impossible to exceed 300 tons cargo capacity for vessels plying the Amu-Dar'ya. Navigation on the Sea of Aral is conducted without particular difficulties: depths are quite sufficient even for large vessels, and draught is limited only by the depth at the end-stations, that is Aral Bay and the estuary of the Amu-Dar'ya, where

dredging is done. Up to 1929 Muynak Landing was the end-station for sea navigation. River navigation then ran along the Kartabay Branch. By 1929 Muynak Bay was so clogged with silt from the Amu-Dar'ya that it became difficult for sea-going vessels to approach Muynak. In view of this, in 1929 the end-station for sea navigation was shifted to Kantauzyak, Landing, later to Uchsay. The Amu-Dar'ya and Sea of Aral Fleet consists of different types of vessels. For a long time the antiquated barge fleet was large in numbers and tonnage, a fleet which had been built up long ago. In 1930-35 from the lower reaches of the Amu-Dar'ya these barges were rapidly being replaced by a steam tug-drawn fleet, and by 1935 the ratio of these primitive barges along the lower reaches had decreased to 27%. In the period under study on the middle reaches of the river the replacement of primitive barges with a mechanized fleet proceeded less intensively and in 1935 the primary type of transport along this part of the river was the primitive barge, which handled 80% of all freight. In absolute figures the primitive barge transport serving Khorezm as of 1 July 1934 totalled 298 units with a cargo capacity of 13,886 tons belonging to the Central Asia Steamship Lines, and 66 units totalling 2157 tons cargo capacity belonging to the Kayuktrans Artel.[12]

The first river steamers and regular barges appeared on the Amu-Dar'ya soon after Central Asia was joined to Russia. The Amu-Dar'ya naval flotilla was commissioned in 1889. After the construction of the Tashkent Railroad the fleet on the Sea of Aral and the Amu-Dar'ya was strengthened. During the next 20 years the river fleet remained almost static in numbers, and at the moment of the formation of the Central Asian Steamship Lines (1923) on the Amu-Dar'ya there were only 6 steamers and 15 barges. Up to 1934 the fleet was supplied with both newly-built steamers and steamers transferred from other basins. This was required by the industrialization and collectivization of agriculture in the republic. In the period under study the region along the lower reaches of the Amu-Dar'ya was still cut off from the railroad network. Interregional links, that is economic links between the Kara Kolpak ASSR and Khorezmskaya Oblast with other republics in the country was achieved exclusively by water through the trans-shipping points of Chardzhou and Aral'sk. In order to provide safety for ship movement on the Amu-Dar'ya, and satisfaction of the needs of the region for shipments, during the first Five Year Plan facilities began to be built on the river, which furthered the growth of cargo shipment volume. In order to handle an increasing volume of freight shipments, in 1930-33 the formation of a tractor-drawn fleet began, completely unknown on other rivers. The construction of a

tractor fleet made it possible to cut down sharply the size of the privately owned primitive barge /kayuk/ fleet, which totalled 800 units in 1930 and carried out the majority of Amu-Dar'ya shipments (in 1929 kayuks throughout the entire Amu-Dar'ya Basin carried twice as much as the rest of the fleet put together).

During this period industry could not provide the economy with a sufficient quantity of hauling equipment, and therefore it was necessary to build up the fleet primarily with local resources. In 1930-1932 the State Steamship Lines built 350 kayuks; at the same time construction began on a tractor engine fleet, that is low tonnage (30-100 t), light construction iron and wooden (kayuk type) vessels, upon which were installed as an engine tractor motors of various makes: "Fordzony", imported "Intery", CTZ and Kommunary, etc. In 1934 a total of 40 passenger, cargo and towing vessels were built with tractor engines. In the operation of these tractor vessels a number of important shortcomings were brought out, which include the following: 1) the inconsistency between the normal number of revolutions of a tractor drive shaft and the normal number of revolutions of a screw propeller, hence the utilization of the motor capacity by only 55-90% (depending on type); 2) the extremely low work capacity of the vessels against the current, which was a result of the low capacity of their motors with the strong currents of the Amu-Dar'ya; 3) consumption of expensive fuel; 4) short use life: wooden hulls -- 2-4 years, iron hulls -- up to 12 years; 5) high cost of repair.

In spite of these shortcomings the tractor fleet aided in coping with an increasing volume of freight shipments. In 1933 Uzbekistan River transport[13] hauled 293,700 tons of cargo, including grain -- 81,500 tons, petroleum -- 31,200 tons, lumber -- 19,500 tons, and cotton -- 48,900. During the First Five Year Plan cargo shipments along the Amu-Dar'ya were increased due to mixed railroad-river transport through Aral'sk. Lumber from the northern part of the European RSFSR, the Urals, grain from Kazakhstan came into the area of the lower reaches of the Amu-Dar'ya more and more through Aral'sk. Such cargoes as fabrics, clothing industrial equipment, textile products and consumer goods began to come to the lower reaches of the Amu-Dar'ya through Aral'sk from the industrial section in the center of the country. The continually developing economic relationships of the areas required a further development in civil aviation. The organization of an economic foundation for socialism in the republic not only required an increase in the volume of goods to transfer, passenger service, but also a timely and rapid service for passengers. This was of great importance for the economy, since the creation and further development of new and reconstruction of

existing branches of industry, as well as an upswing in agriculture, required effective leadership and close ties between the oblasts of the republic. Direction of USSR civil aviation starting in 1930 had been handled by the All-Union Civil Air Fleet Company, and in 1932 it was taken over by the Main Administration of the Civil Air Fleet Under the Sovnarkom USSR. Proceeding from the requirements of the national economy, in the plan for the development of USSR aviation for 1929-1933 the highest rate was planned for civil aviation. In 1929 the first Soviet passenger aircraft for main line service was built, comprehensively tested and put into series production -- the PS-8 (ANT-9). In addition the Civil Air Fleet made extensive use of aircraft designed by K. A. Kalinin. In addition, German single-engine 10-34 planes were used. The interests of the development of the national economy required that their lines interconnect various areas. In the period under study the total length of airlines in the republic was increased by more than 600 km; the Fergana Valley was linked with Tashkent, and the number of flights per week grew. Air transport operations improved considerably. In the period under study it was essential to wipe out the vassal-like dependence of the country on foreign nations. This required a great increase in cotton farming. Local aviation played a decisive role in combatting farm pests. PO-2 planes could spray 100 ha in a ten-hour workday, while a horse-drawn sprayer could handle only 14. Consequently, air transport during the first Five Year Plan, although it was not one of the primary forms of transport, nevertheless played a definite part in the development of the republic's economy. During the first Five Year Plan freight and passenger turnover for all types of transport in the republic increased considerably. The primary method of developing transport -- reconstruction -- required less capital investment than the construction of new means of transportation. Alongside the reconstruction of rail transport small railroads were built to coal mines and cotton regions. Operations improved considerably. The influx of motor vehicles to the republic increased in view of the beginning of the series production of Soviet makes. This made it possible to raise the ratio of motor vehicle transport in handling freight in the republic. The increase in the number of motor vehicles in use was accompanied by an improvement in the condition of roads. River transport developed thanks to the reconstruction of the fleet and addition of new vessels. This made it possible to limit greatly the sphere of activities of the privately-owned kayuk fleet. In order to increase the safety of navigation and increase the volume of carge shipments improvements began to be made on the river itself. The sphere of use of civil aviation was greatly expanded both for passenger service, mail and baggage transfer, as well as in agriculture.

CHAPTER THREE

TRANSPORT DURING THE PERIOD OF ECONOMIC RECONSTRUCTION AND THE VICTORY OF SOCIALISM IN UZBEKISTAN (1932-1940)

Successfully carrying out the first Five Year Plan, the country moved forward to the Second Five Year Plan for the development of the national economy. The reconstruction of all branches of the economy was possible only on the basis of well-organized rail transport, which was very important for establishing and maintaining ties between old and new economic regions. In coping with a growing freight transfer of great importance was an increase in train weight. This made it possible to save on capital investment necessary for increasing the carrying capacity of various rail sections. If with an increase in freight turnover during this period of 100% the weight per train had remained the same, in order to cope with the increased turnover it would have been necessary to build second tracks or build a new railroad. Both variants required tremendous capital investment. In order to satisfy the requirements of the economy for goods and passenger transfer and to cope with the increased freight turnover, the selected method, that is the reconstruction of rolling stock and rail facilities, was justified. The gross train weight increased to 1090 tons in 1931 and 1268 tons in 1938, as compared to 540 tons in 1919. This meant a considerable increase in the carrying capacity of the railroads. In 1936 the Central Asian Railroad was split up into the Ashkhabad and Tashkent. The Tashkent Railroad, from 1 July 1936, was operated within the following territorial limits with the following transfer points: from the Ashkhabad Railroad -- Ziadin Station, from the Orenburgskaya Railroad -- Dzhusali Station, and from the Turkestan-Siberian -- Arys' Station. The Tashkent Railroad intersects and serves extremely important economically well-developed oblasts of Uzbekistan -- Ferganskaya, Andizhanskaya, Namanganskaya, Tashkentskaya and Samarkandskaya oblasts. The remaining oblasts -- Bukharskaya, Kashkadar'inskaya and Surkhandar'inskaya -- are served by the Ashabad Railroad.

A large section of the Tashkent Railroad passed through the Kazakh SSR. From the beginning station -- Dzhusali -- to Sauran Station the railroad ran through the Kzylordinskaya Oblast of the Kazakh SSR, from Sauran Station to Keles Station going through Yuzhno-Kazakhstanskaya Oblast in the Kazakh SSR. Further on the line went through Uzbek territory; the section

from Keles Station to Obruchevo Station services Tashkentskaya Oblast. From Obruchevo Station to Ziadin Station the line passes across Samarkandskaya Oblast. The branch from Ursat'yevskaya Station to the Fergana Valley passes through Uzbek territory, with the exception of the section from Khilhovo Station to Mel'nikovo Station with the coal spur extending to Shurab Station, which runs across Leninabadskaya Oblast of the Tadzhik SSR. The Stations of Kzylkiya, Osh, Kashgarkishlak, Dzhalalabad, Bagish, Kokyangak, and Tashkumyr are located in Oshskaya and Dzhalalabadskaya oblasts of the Kirgiz SSR. In 1937 the Tashkent Railroad extended 2009 km, only 1040 actually within the territory of Uzbekistan. The fact that the Uzbek republic was served by two railroads -- the Ashkhabad and the Tashkent -- created difficulties, particularly in planning cargo shipments. The freight shipment plan for Bukharskaya, Kashkadar'inskaya and Surkhandar'inskaya oblasts was drafted by the Ashkhabad Railroad, and problems dealing with the current and future planning of the economy of these oblasts were handled by appropriate ministries and the Gosplan Uzbek SSR. Particularly intensive was the improvement in facilities on the railroad beginning in 1936, when large-scale projects were done in the construction of double track sections, the development of stations and junctions, communications equipment and signal equipment, centralization and block signal setups, the development of electric power stations, improvement and increase in water supply, etc.

In order to cope with increased freight turnover it was necessary not only to build up the locomotives and freight cars on hand, but also to develop in a planned and proportionate manner the entire series of railroad operations so that one branch would not slow down the development of another. The construction of new plants, combines, factories, an increase in coal and petroleum extraction, as well as the development of farming in the Fergana Valley were the main factors in increasing the handling capacity of Kokand Station, and the development of the economy of the Southwestern Region of Uzbekistan, as well as the Turkmen and Tadzhik SSR -- Ursat'yevskaya Station. We should note that in increasing the handling capacity of Ursat'yevskaya Station an important role was played by freight cars coming from the Fergana Valley. The absence of equipment necessary for accelerating the processes of assembling and disassembling trains at Kokand and Ursat'yevskaya Stations complicated the station operations. Cars stood for long periods of time at section stations and approaches to them, and the volume of freight on wheels increased, etc. The handling capacity of Kokand and Ursat'yevskaya stations did not allow for handling all the freight movement. Therefore it was essential to increase their handling capacity, for which sloping yards were built at these two stations

(1936-1938), with the aid of which car dispersement was effected. During the second Five Year Plan, when industrialization was proceeding on a broad scale, in Central Asia the volume of freight shipments constantly increased both within the USSR rail system and on the Tashkent railroad. The increase in volume was accompanied by an increase in shuttling operations, that is assembling and disassembling trains at large stations, particularly freight yards located at the junction of two and three roads. Such a station was Arys' which, although located in the Kazakh SSR, plays an important part in the operations of the Tashkent road, since transport ties between the Central Asian republics and the European part of the country, the Urals, Kazakhstan, Eastern and Western Siberia, the Altai, The Far East and the North run through the station of Arys'. Arys' is located at the junction of three lines -- Turkestan-Siberian, Orenburg and Tashkent. At Arys' Station freight cars are sorted, trains for the south, north and west are assembled and disassembled. All of this amplifies the problem of increasing the handling capacity of the Arys' station, for which a fully mechanized yard was built (1936-1938), which increased the handling capacity of this station. In coping with the increased freight turnover an important part was played by the building of double track sections of single track lines along the most difficult sections, the building of additional tracks at stations, improving rail facilities, etc. During the Second Five Year Plan rolling stock utilization improved. The per-axle freight car load increased and the commercial rate of train movement increased, as well as the train weight, and average-daily freight car and locomotive run increased, as well as rolling stock turnover, etc. An improvement in rolling stock utilization played an important part in handling increased freight turnover. In the period under study the volume of passenger transfers increased 10% both in local and express service. During the Second Five Year Plan rail transport developed primarily through the improvement of locomotive facilities, freight yards, small railroad sections and double track sections, partial reconstruction of rail facilities, etc. The technical facilities level for rail transport corresponded to the volume of train movement, although many busy areas and certain economic regions needed new railroads built. The directors of the third Five Year Plan for the development of the economy provided in the area of rail transport a regulation of freight turnover planning, a decrease in inefficient long rail hauls. In the first year of the Third Five Year Plan, thanks to a developing industry and agriculture in the Central Asian Republics, freight turnover on the Tashkent road increased 5% over 1937, and 15% in

1940. The increased freight turnover was handled through further reconstruction of technical railroad facilities. On certain lines of the Tashkent main line, through which freight of neighboring Central Asian republics passes (besides Uzbek freight), the powerful FD mainline locomotive was put into service. The introduction of the FD locomotive made it possible to increase sharply the carrying capacity of railroad sections. Possessing great speed and hauling capacity, the FD locomotive aided in an improved satisfaction of the requirements of the republic's economy for goods shipments. The FD locomotive was the deciding factor in increasing train weight. Use of the powerful FD locomotive required reconstruction of the tracks, since the tracks still consisted of rails primarily of light and medium weight -- IIIa, IVa, and the number of ties per km of track was insufficient, and on certain sections the tracks lay on sand ballast. By 1940 the tracks had improved greatly due to the laying of IIa rails instead of light, as well as due to an increase in the number of ties per km of track, the replacement in many sections of sand ballast with gravel. In increasing train weight an important part was played also by adding to the freight cars available four-axle boxcars, flatcars, gondola cars and tank cars equipped with automatic couplers and brakes. The length of a train formed of four-axle cars was less, but the weight was more than that of a train made up of two-axle cars. The introduction of large-load cars was due to an increase in shipments of lumber, grain, petroleum, industrial equipment, etc. The introduction of large-capacity cars aided also in savings in capital investment necessary for lengthening sidings at many stations. In increasing the carrying capacity of railroads and insuring traffic safety an important part was played by a gradual transition to sturdier rails and the introduction of semi-automatic block layout for train movement. At the end of 1940 the operational road length was 2,015 km,[1] one km of rails were types I and Ia, 182 km -- II and IIa, 491 km -- III and IIIa, and 1241 km -- IV and lighter. The tracks for 1,405 km lay on gravel and rock ballast, and the rest on sand.[2]

In order to increase the strength and resilience of the earth roadbed, only impregnated ties were used. As is well known, the more ties there are per km of track, the stronger it is and the higher the degree of train movement safety is. In 1940 the average number of ties per km was 1,469, and on main lines -- 1,841 and more.[3]

By 1940 on all sections of the Tashkent main line train movements were controlled by an electric semaphore system. It is true that on a short sector (22 km) train traffic was controlled with a semi-automatic block system.

In 1940 freight shipments on the Tashkent main line totalled 6.9 billion rate-ton-kilometers, and passenger transfer -- 2.3 billion passenger-kilometers. This was 15% greater than 1937. The Uzbek SSR accounted for 53.6% of freight shipped and 82% of freight received among the republics served by the Tashkent Railroad. In view of the industrial development of Uzbekistan by 1940 industrial freight averaged a ratio of 40% in freight turnover on the Tashkent Railroad; coal averaged 10.4%, petroleum products -- 12.9, lumber -- 8.1, etc. The rest was made up of light industry and from products. The Tashkent Railroad serves not only the rge economic regions of Uzbekistan but also certain areas of neighboring central Asian republics. We include below figures on shipment and delivery of freight for the republics in Central Asia served by the Tashkent railroad in 1940, in percentage.

Republic	Outgoing	Incoming
Kirgiz SSR	16.4	5.2
Kazakh SSR	8.6	8.7
Uzbek SSR	53.6	82.0
Tadzhik SSR	21.4	4.1

Among the republics served by the Tashkent railroad the Uzbek SSR was top both in outgoing and incoming freight. The growth in freight turnover increased the average daily loading and unloading operations. In 1940 average daily loading operations totalled[4] 1394, and average daily unloading operations -- 1638 conditional freight cars, that is, unloading operations were greater. The development of industry, an increase in coal and oil extraction made it possible to increase the amount of loading operations of industrial cargoes. For example the percentage of coal in the total loading operations was 16, petroleum products 38, ore 2, grain 2.4, flour 2, building materials 20.3 and cotton fiber 7.4. The creation of a material-technical basis for socialism in Uzbekistan required an increase in the shipment of industrial goods from the Urals, from the central industrial region, the Ukraine and Leningrad, etc.

In 1940 incoming rail shipments totalled 8.7 million tons, that is 260% more than in 1928. Of these shipments of coal and coke totalled[5] 1,408,000 tons, petroleum products -- 801,000 tons, ferrous metals -- 97,000 tons, lumber -- 532,000 tons and grain -- 1,158,000 tons. The hauling in of industrial goods, the development of the production of building materials in Uzbekistan and the extensive enthusiasm on the part of the peoples of the republic played a decisive role in creating branches of heavy and light industry and in the development

of agriculture, particularly cotton farming. This made it possible to increase the volume of freight shipments (Table 8).

Table 8

Goods Shipment by Rail*

Uzbek SSR	1928	1940	How many times increased in 1940 over 1928
Coal and coke, 1000 tons	126	10	-
Petroleum products	45	331	7.3
Ferrous metals	-	48	-
Grain	98	791	8.0
Cotton fiber	248.8	540	2.17
Total, million tons	1.6	5.4	3.4

*Transport i svyaz' SSSR (USSR Transport and Communications), pages 70-74.

As can be seen from Table 8, the volume of goods shipment in the period under study was increased by almost 240%. In coping with the increased freight turnover an important part was played by an improvement in utilization of rolling stock. An increase in the dynamic per-axle load per loaded freight car up to 7.69 tons in 1940 made it possible to decrease the requirements for freight cars. The beginning of operations of powerful series FD locomotives and an improvement in the condition of the tracks made it possible to speed up trains and the average daily run of locomotives and cars. The average commercial speed of train movement was 20.4 km/hr, and the average daily locomotive run -- 250 km and freight car run -- 188 km. This made it possible to accelerate freight car turnover, that is cut down the time required between two loading operations. Freight car turnover totalled 3.41 days. Up to 1940 rail transport in Uzbekistan developed chiefly through the reconstruction of rolling stock and road improvements and the construction of small railroad sections. In the freight turnover breakdown major changes occurred. With an increase in shipment volume the ratio of industrial goods increased. Coal, petroleum products, and mineral building materials in the freight turnover of the Tashkent main line totalled from 6 to 13% each. The planned Socialist economy showed its superiority over the capitalist in the development of rail transport also in the USSR national republics. During the second and third Five Year Plans road transport and the road network were greatly developed. Much attention was devoted toward improving the road system. An expansion of the road system with paved surfaces exerted a positive

influence on the further economic development of the republic. In addition, it made it possible to improve greatly the operations of the trucks in use. The higher the category of road the less wear is experienced by truck parts, the longer their effective life is and the lower are operational costs (Table 9).

In 1932-1939 reconstruction was carried out along the entire dirt road of the Fergana Road Belt from a dirt road and partially paths to gravel, and in some places to cobblestone, on which all motor vehicles could travel. In 1937 the road system of Uzbekistan totalled[6] 27,700 km, of which natural dirt roads totalled 20,900 km, improved -- 4,600 km, roads with gravel surfaces -- 2000 km, cobblestone-paved -- 200 km. The construction of few branches of industry during the second five year plan, the development of agriculture, culture and art were the main factors in the growth of the truck freight volume. In 1937 there was a total of 11,752 trucks,[7] which hauled 15,426,000 tons of freight. The improvement in the road system and increase in number of vehicles were accompanied by a growth in truck shipment volume. The ratio of truck transport in the republic's freight turnover totalled 47.0%. During the Third Five Year Plan motor vehicle transport and roads were developed further. For the efficient utilization of truck transport a shipment dispatcher administration was organized, which worked out a plan-warning system for service and repair of trucks, and truck transport organizations of general use began to shift to cost accounting. All of these measures furthered an increase in labor productivity. The forms of directing motor vehicle transport improved. In 1939 people's commissars of truck transport were organized in the union republics, which took over the general use of truck transport organizations, the automotive repair and tire repair plants and shops, garage service facilities and training facilities. The increase in the number of trucks in the republic was accompanied by an improvement in the condition of roads. The main highway built and rebuilt before 1940 was the Great Uzbek Highway, which intersects Tashkentskaya, Samarkandskaya, Kashkadar'inskaya and Surkhandar'inskaya oblasts of the Uzbek SSR. The highway has a hard surface and is open throughout the year. This highway runs across the following mountain ranges: Nuratau between Dzhizak and Samarkand, the Zeravshanskiy Range between Samarkand and Kitab, spurs of the Gissar Range between Dekhkanabad and Derbent. Bus service along the highway has lightened the load of suburban and local service on the railroad. The rebuilt Fergana Road Belt runs through the large cities of the Fergana Valley: Kokand, Margelan, Leninsk, Andizhan, Namangan, Chust. The Fergana Belt carries intensive suburban shipments through the major population centers, as well as interoblast shipments.

Table 9

Gasoline Consumption Depending on Type of Road Surface and Truck Speed*, L/km

a Тип покрытия дорог	b Расход бензина при скорости движения автомобиля, км/час				
	10	20	30	40	50
c Цементобетонное	0,270	0,242	0,268	0,284	0,325
d Черное щебеночное	0,300	0,281	0,290	0,314	0,319
e Черное из слабых известняков	0,289	0,269	0,293	0,301	0,324
f Черное жерствяное (гравийное)	0,314	0,268	0,279	0,301	0,324
g Легтегрунтовое (II дорожно-климатическая зона)	0,265	0,264	0,289	0,320	0,365
h Легтегрунтовое (III дорожно-климатическая зона)	0,271	0,270	0,299	0,320	0,361
i Грунтовое, профилированное	0,298	0,303	0,319	0,323	0,369
j Грунтовое, профилированное (деформированное)	0,375	0,367	0,345	0,420	—
k Грунтовое, профилированное (деформированное и увлажненное)	0,442	0,444	0,405	0,409	0,477

a -- Type of road surface
b -- Gasoline consumption at various speeds, km/hr
c -- Cement-concrete
d -- Blacktop with rock ballast
e -- Blacktop with weak limestone
f -- Blacktop on gravel ballast
g -- Tar and dirt (road-climatic zone 2)
h -- Tar and dirt (road-climatic zone 3)
i -- Graded dirt
j -- Graded dirt (deformed)
k -- Graded dirt (deformed and wet)

*Tekhniko-ekonomicheskiye Problemy Razvitiya Avtomobil'nogo Transporta v 1959-1965 gg. (Technical-Economic Problems of the Development of Motor Vehicle Transport in 1959-1965), MIEI, edition XVI, Moscow, 1961, p. 48.

The Fergana Road Belt played an important part in the development of cotton farming in the valley and in the construction of the Great Fergana Canal and other canals. The roads of the Fergana Valley are of a specific, long since formed configuration, which is influenced by the railroad system which runs through the Fergana Valley. The main highway in the valley runs almost parallel to the Fergana Railroad Belt Line. Alongside its great economic importance the Fergana Highway has a great administrative importance, joining into a single region all oblasts and rayons in the valley. All the roads in the republic at the end of 1940 totalled 31,600 km, including 4,600 km of hard-surface roads. Truck transport freight turnover in 1940 in the Uzbek economy totalled 148 million ton-kilometers, or 1.7% of total USSR truck transport. Freight shipments[8] totalled 18 million tons or 2.1%. Truck transport freight turnover of general designation for the Uzbek SSR for 1940 totalled[9] 7.7 million ton-kilometers or 2.9% of total general use truck transport freight turnover in the USSR, and freight shipments totalled 382,000 tons or 2.4% respectively. Such a small ratio of general use truck transport in the republic is explained by the fact that each ministry (former peoples commissariats), the plants, factories, combines, colleges and offices and other institutions had their own motor pools and handled shipments independently, although this was costly and inefficient.

During the years of the pre-war Five Year plans bus service developed both in the large cities and inter-urban service. In 1940 general use bus transfer of passengers in Uzbekistan totalled 8.8 million persons or 1.5% of the USSR, and passenger turnover was 70 million passenger-kilometers or 2.0% of the USSR[10]. Measures undertaken up to 1940 for improving highways and truck transport made it possible to eliminate to a great extent the lack of good roads in Uzbekistan and to develop truck transport. In order to speed up an upswing in productive forces in the republic it was essential in subsequent years to improve roads.

River transport during the second and third Five Year plans. The development of the productive forces of the lower reaches of the Amu-Dar'ya required a large volume of shipments for the national economy to be hauled into the area of the lower reaches. Developing industry and farming required industrial goods, which were hauled into this area by water. In order to cope with the growing volume of shipments it was necessary to improve the fleet and improve hauling operations. In 1935-1938 the self-propelled fleet of the Central Asian State Steamship Lines was joined by the passenger-freighter Zhdanov, the tug fleet by the steamships Andreyev, Papanin, etc.[11] We should note that most of the

Table 10

Characteristics of Primary Vessels Built During Pre-War Five Year Plans*

Наименование судов	Тип судна	Мощность, л.с.	Грузоподъемность, т	Пассажирск. вместимость, чел.	Род топлива	Осадка: в порожнем сост., м	Осадка: в груж. сост., м	Год постройки	Материал корпуса
Грузопассажирский флот									
.Жданов"	пароходу	200	—	110	мазут	0,78	1,0	1937	сталь
.Советская Киргизия"	теплоход	220	420	45	диз.топл.	1,23	3,15	1931	.
.Туркменистан"	.	60	—	90	керосину	0,48	0,8	1932	.
.Шевченко"	.	60	—	74	.	0,5	0,75	1932	.
Буксирный флот									
.Андреев"	пароход	320	—	—	мазут	0,75	0,40	1935	.
.Актюбинск"	.	200	—	—	.	1,5	1,7	1930	.
.Папанин"	.	800	—	—	.	0,85	0,99	1938	.

a -- vessel designation
b -- type of vessel
c -- horsepower
-- cargo capacity, tons
e -- passenger capacity
f -- type of fuel
g -- draught
h -- empty, m
i -- loaded, m
j -- year built
k -- hull material
l -- cargo-passenger fleet
m -- Zhdanov
n -- Sovetskaya Kirgiziya
o -- Turkmenistan
p -- Shevchenko
q -- Tug Fleet
r -- Andreyev
s -- Aktyubinsk
t -- Papanin
u -- Steamer
v -- Diesel-powered
w -- fuel oil
x -- diesel fuel
y -- kerosene
z -- steel

* According to figures issued by the Central Asian State Steamship Lines.

tug fleet was built before 1940. Loaded they drew an average of 1.0 m. In 1938 the republic's water transport facilities hauled 646,400 tons of freight, or 120% more than in 1933,[12] including 152,700 tons of grain, or 70% more, 74,900 tons of petroleum or 370% more, 61,100 tons of lumber or 360% more, 87,200 tons of cotton or 90% more. During the prewar five year plans the Central Asian State Steamship lines received a large number of steam powered vessels, diesel-powered vessels, metal and wooden barges. The types of basic vessels built during the pre-war five year plans and their specifications can be found in Table 10.

The cargo-passenger fleet was operated chiefly on the Aral Sea, with the exception of the steamer Shevchenko. It is apparent from Table 10 that the tug fleet in a loaded state on the Amu-Dar'ya draws rather deeply and is almost equal to the average river depth. Before 1940 the tug fleet was joined by 32 vessels. The new vessels finally put an end to the Kayuki. During the Second Five Year Plan the Civil Air Fleet service volume increased. During the period under study airports were completed in all oblast seats. Each oblast seat was connected by air with the seats of the major administrative regions. By 1937 there was a total of 5,320 km of airlines in the republic, that is almost double 1932. The addition of new aircraft and an increase in the standard of living aided an increase in passenger service. In 1937 civil air transport in the Uzbek SSR carried 12,600 persons as compared to 900 in 1932, 473.3 and 10.5 tons of mail respectively, as well as 1,382.8 and 11.4 tons of cargo.[13]

The part played by aviation in the fight against crop pests increased, and the PO-2 aircraft was used as formerly. In addition to fighting crop pests, planes were used for spreading mineral fertilizer, chemical weed-killing, as well as for serving herdsmen on distant pastures. During the prewar five year plan civil aviation in the Uzbek transport system was of modest importance, but the republic capital was connected by a regular flight to Moscow, Leningrad, and the major cities and resort areas of the country. In addition, Tashkent was joined to all oblast seats in the republic. In 1938-1940 local aviation developed particularly along the lower reaches of the Amu-Dar'ya. Planes flew regularly from Nukus to all rayon seats in the Kara Kalpak ASSR, since up to 1940 along the lower reaches of the Amu-Dar'ya there was as yet no railroad and decent roads practically did not exist. The main form of transport for passenger transfer, particularly during the winter, was air. During the peacetime years of the third Five Year Plan all types of transport -- rail, motor vehicle, river and air -- developed in accordance with the needs of the republic's economy. Consequently,

during the period under study the main method of coping with increased freight turnover was the reconstruction of transport. A great percentage of capital investment was utilized in the reconstruction of transport. This period is characterized by the fact that technical reconstruction was carried out on a broad front, which made it possible to handle the continually increasing freight turnover with less capital expenditure. The creation of a material-technical basis for socialism in the republic constituted the primary factor in the growth of industrial goods shipments. Transport aided in industrial and agricultural development in the republic and reflected all changes taking place during the pre-war five year plans in the economy.

CHAPTER FOUR

UZBEKISTAN TRANSPORT DURING THE GREAT WAR FOR THE FATHERLAND AND THE POST-WAR PERIOD

Measures carried out before 1940 on the Tashkent Railroad in order to increase the locomotive power and tracks as well as rolling stock made it possible to carry out the assignments handled by the road during World War II. As is known, the goods shipment structure characterizes the economy of the area served by the railroad. Farming in the area of the railroad up to 1940 was characterized by well-developed cotton farming, grapes, orchards, truck farms and melons, as well as industrial silk raising. Before World War II industry in the area was represented primarily by the processing of products of cotton raising in the form of the cotton cleaning industry (35 cotton mills), butter (6 butter plants), cotton wadding (two large factories) and the textile industry in Tashkent and Fergana, the processing of silk products, as well as the production of various food items, particularly the processing of canned fruits and vegetables. The metallurgical industry was represented by the Tashsel'mash Plant, which produced farm implements, repair facilities and shops in the large cities, serving exclusively the needs of farming. The mining industry consisted of ore extraction of non-ferrous metals in mines of the Achisayskiy and Kansayskiy combines of the commissariats of non-ferrous metals. During World War II substantial changes took place in the economy of the area, particularly in industry, due to the numerous evacuated plants and factories. As a result of great industrial development the area of the railroad and particularly Uzbekistan was transformed into a well-developed industrial complex, furnishing significant amounts of industrial products, which are hauled to other economic regions throughout the country. New branches of union industry arose. This could not but reflect on rail transport operations. In 1941-1945 changes occurred also in the agriculture of the region. For example, cotton plantings were decreased; in 1944 the area under cotton totalled 685,000 ha as compared to 928,000 in 1941. In 1942 in Uzbekistan mass plantings of sugar beets were made for the first time, on an area of 56,000 ha. From this moment a new branch of Uzbek agriculture developed -- sugar beets. The substantial changes in agriculture in the area of the railroad include the increase in area under grain. All of this sharply changed the composition and direction of freight flow. Substantial changes occurred in inter-regional

relations in coal, ferrous metals, petroleum and lumber shipments, military goods, etc. In 1943 the transit flow of coal from the Tomsk Railroad to the Orenburg across the Tashkent Railroad increased, with a simultaneous decrease of coal hauled in on the Tashkent Road. The flow of petroleum shipments from the Ashkhabad Road to the Orenburg across the Tashkent road increased by almost 1400%. Substantial changes in the economy of the region of the railroad were reflected on its freight shipments, particularly on the economic ties between Uzbekistan and other regions in the Soviet Union. In 1943 the total volume of goods hauled in decreased by half in comparison with 1940. In 1940 shipments totalled 4,000,000 tons, in 1941 -- 3,896,000, 1942 -- 2,601,000, in 1943 -- 1,989,000, 1944 -- 1,823,000, and shipments out increased respectively -- 2,310,000, 2,376,000, 1,661,000, 1,821,000, 1,143,000 tons. The total volume of goods shipped in and out during World War II decreased, but substantial changes took place in the freight turnover structure. A sharp decrease in goods shipped in took place through coal shipments, which in 1943 totalled 267,000 tons as against 515,000 tons in 1940, petroleum products -- 377,000 as compared to 533,000, grain -- 186,000 and 842,000, lumber -- 376,000 and 703,000, mineral fertilizers -- 8300 and 325,000. A decrease in coal hauled into the republic from other, remote regions of the country is explained by the fact that during the war years industrial processing of coal from the Angrenskoye Coal Field began, while the Donbass was temporarily occupied. Decrease in the shipments of lumber to the republic were explained by the temporary decrease in the volume of construction, mineral fertilizers by temporary occupation of the Ukraine, where mineral fertilizer plants are located, and the decrease in the area under cotton -- by the fact that cotton was the chief consumer of mineral fertilizer, as well as the oil shipments, shipments destined to the front, etc. On the other hand, shipments of ferrous metals greatly increased. In 1940 97,000 tons were hauled in while in 1943 the figure increased to 145,000. An increase of ferrous metals hauled into the republic was caused by the production of war industry goods here. One can judge the changes in the region of the railroad and the distribution of productive forces by studying the loading and unloading dynamics for the road for 1940-1944. Before World War II unloading operations were more extensive than loading; empty freight cars, after unloading, were sent to other roads in order to regulate the number of empty freight cars. In 1941-1945 both loading and unloading operations were cut significantly. We should note that during this period the volume of unloading operations as formerly was greater than

loading. As a result of the great decrease in the volume of unloading operations the volume of loading operations during certain years of the war was almost identical to unloading volume. At the end of the period under study unloading operations as formerly were more extensive than loading. A decrease in coal shipments to Uzbekistan during the war years is explained by the development of coal extraction in the republic and neighboring republics. The Kzyltukumachi-Angrey Railroad, built in 1944, 114 km in length, was very important for developing coal extraction and gave a sharp impetus to the development of the productive forces of the Angren Mining area. Before the development of the Angren beds coal was hauled in great quantities from the Kuzbass and Karaganda. Coal hauled in long distances not only increased transport costs in the economy but also overloaded rail transport and complicated its operations. As a result of cutting down the volume of goods shipped in and out the freight turnover decreased, and in 1945 it totalled 4.2 billion tariff-ton-kilometers as against 6.9 in 1940. The decrease in freight turnover naturally involved a decrease in freight handling operations, that is the average-daily load, the figure for which in 1945 was greatly decreased in comparison with 1940. Average daily total of coal hauled was 156 and 222 conditional cars respectively, petroleum and petroleum products -- 174 and 53, mineral-building materials -- 107 and 282, cotton -- 176 and 386. During the war years the arrival and departure of trains in all oblasts in the republic cut down. As a whole for the republic freight volume arrival was 55% of the 1940 level and freight departure 60%. During the war years the total number of passenger transfers made was cut in half. However, the ratio of suburban service increased more than 10%. The decrease in service was due chiefly to long-distance direct service.

Industrial development in the region of the railroad through evacuated plants more or less stabilized the shipment of industrial goods. During the war shipments of goods to the front along the road increased considerably. Here we should note that the Tashkent road not only supplied the industry of Uzbekistan, operating for the needs of the front, but also a huge quantity of war goods was hauled in transit along the road, goods destined for the Stalingrad and Caucasus fronts. Shipments of military industrial goods and transit shipments constituted one of the reasons for increasing the number of locomotives on the road. In 1942 the powerful SO series locomotive began service on the road, and later the SOk with steam condensation, which played an important part in the economy of the Uzbek SSR. The SOk series locomotive with condensation consumed less water. This resulted in

savings of water and fuel. The SO locomotive was much more powerful than the EShh locomotives. The beginning of operations of the SO locomotive made it possible to increase train speeds, and the carrying capacity of certain railroad sections. In view of the use of FD and SO main line locomotives on the main freight shipment lines of the Tashkent main line, hardly any decrease in train weight occurred, although freight turnover dropped. In 1940 gross train weight[1] was 4,213 tons, in 1943 -- 1,127 and in 1945 -- 1,175. Operation of main line locomotives required a strengthening of the tracks, since before World War II medium and light rails were laid on the roads. By 1940 types IIa, IIIa, and IVa lay on 14%, 25% and 61% respectively on the main lines. Due to a strengthening of the tracks, the total length of lines with Ia and IIa rails increased. By 1945 type Ia rails lay on 4.3%, IIa -- 15.4%, IIIa -- 23.3% and IVa -- 57%.[2] During the war the laying of type Ia and IIa rails did not occur extensively on the main lines. In increasing the number of ties to 1840, even with type IIa rails, a sufficient track strength was achieved for carrying powerful FD locomotives. Therefore during World War II, the tracks were strengthened by increasing the number of ties per km. In 1940 the percentage of main lines with 1,440 ties per km and less totalled 50.3%, 1441-1600 -- 40.4%, 1601-1840 -- 3% and 1841 and more -- 6.3%, while in 1945 these figures were 39, 49, 5 and 7% respectively. During World War II rolling stock utilization worsened in many indices. In the period under study freight car turnover increased. This is due to a decrease in the section rate of train movement, poor mechanization of loading and unloading operations, which cut down the average daily freight car run. Freight handling personnel did everything in their power to improve the utilization of freight handling equipment and freight car capacity. Since rail transport was suffering from a shortage of cars, it was necessary to haul more freight with fewer cars. Due to this the dynamic per-axle load for loaded cars hardly changed at all. During the war years labor productivity per worker decreased from 358,500 t/km in 1941 to 233,300 t/km in 1945, that is by 35%, although the number of employees in operations decreased by 6.4% during this period.[3] A decrease in labor productivity on the Tashkent main line during World War II is explained primarily by the decrease in freight turnover. We should note that the decrease in labor productivity occurred not only as a result of a decreased freight turnover, but also due to a worsening in the rolling stock utilization.

Rail transport in 1946-1950. Although in World War II rail transport in Uzbekistan was not subject to enemy damage, it did undergo damage. The tracks contained rails and ties

which needed to be replaced. In a large number of locomotives the mileage between major and medium repairs was increased, a large number of freight cars required repairs, etc. Restoration of the republic's economy also required a rapid improvement and reconstruction of rail transport. In addition, in the other central Asian republics work was also being done to restore and develop the economy. In view of the fact that transport-economic ties between the neighboring Central Asian republics were maintained through the Tashkent railroad, an increase in its freight shipments was also expected. In order to handle the increased freight turnover it was necessary, first of all, to strengthen the tracks by laying type Ia rails, increasing the number of ties per km of track, as well as through replacing sand ballast with rock and gravel. This aided in improving rolling stock utilization. On many sections speed limits were eliminated, which made it possible to increase the traffic load capacity of railroad lines. The total length of tracks with type Ia rails had increased 800% by 1950, and type IIa -- 26% compared to 1945, that is light rails were being replaced by heavy. Heavy rails, possessing greater strength, carry heavier rolling stock, resist wear better and have a longer life. Therefore the laying of heavy rails provides savings in metal and, consequently, capital investment. During the period under study not only old ties were replaced by new, but the number of ties per km was increased by adding new, impregnated ties. The length of track with 1601-1840 ties per km increased by almost 400% in 1950 and totalled 32% of the total length of track on mainlines in 1945. Much of the track lay on sand ballast, which has a number of shortcomings. Therefore it was necessary to replace this type of ballast with improved types -- rock. An important advantage of rock is the greater strength of the roadbed and decreased operational expenses. In order to strengthen the tracks and decrease operational expenses on maintenance and repairs, sand ballast was replaced by gravel and rock. In 1950 2,042 km of track were on rock and gravel ballast, as compared to 1569 km in 1945. In the period under study the length of track on rock and gravel ballast increased 31%. Thus the continuous increase in freight and passenger turnover on the Tashkent Railroad was accompanied by a strengthening of the tracks and roadbeds. The pre-war freight turnover level was achieved by 1948. The development of the Uzbek economy and the other republics in Central Asia caused not only a restoration of the pre-war freight turnover level, but a further increase (Table 11). A characteristic feature of the development of rail transport after the war is the high rate of freight turnover increase. In 1950 freight turnover on the Tashkent main line increased by 70% in comparison with 1940 and 180% in comparison with 1945. We should

Table 11

Freight and Passenger Turnover on the Tashkent Main Line for 1945-1950, %

a Показатель	1945	1946	1947	1948	1949	1950
b Грузооборот, млрд. тарифных т/км	100	126,2	150,0	169,0	250,0	283,3
c Пассажирооборот, млрд. пасс-км	100	154,5	168,6	136,3	145,4	154,4
d Среднесуточная выгрузка всех грузов, условных вагонов	110	133,1	155,9	157,9	218,1	225,7
e Среднесуточная погрузка всех грузов, условных вагонов	100	130,5	162,3	176,6	191,6	232,8
f Каменный уголь, "	100	107,6	151,9	206,4	277,5	282,7
g Нефтепродукты, "	100	137,9	170,6	154,0	182,7	185,6
h Руда, "	100	100	133,3	155,5	188,8	211,1
i Хлеб, "	100	114,2	207,1	185,7	150,0	171,4
j Мука, "	100	160,0	160,0	210,0	220,0	280,0
k Минеральные строительные материалы,	100	146,7	215,8	254,2	284,1	353,2
l Хлопок-волокно	100	88,5	95,4	89,6	100	—
m Хлопок-сырец	100	222,2	200,0	152,7	236,1	783,3
n Хлопковые семена	100	154,7	183,0	167,9	173,5	—

a -- Index
b -- Freight turnover, billion tariff t/km
c -- Passenger turnover, billion passenger/km
d -- average daily unloading operations on all goods, conditional cars
e -- average daily loading operations on all goods, conditional cars
f -- Coal
g -- Petroleum products
h -- Ore
i -- Grain
j -- Flour
k -- Mineral Construction Materials
l -- Cotton Fiber
m -- Raw cotton
n -- Cottonseed

note that freight turnover increased chiefly through heavy industrial goods. In 1940 the ratio of coal was 15.9%, in 1945 -- 18.4%, in 1950 -- 22.3%. The ratio of petroleum products increased from 3.8% to 16.4. The increased freight turnover was handled also through the introduction of diesel locomotives, improved use of rolling stock and improvement in the methods of handling train traffic on individual sections. In the USSR, beginning in 1924, the Shch^{el}/1 diesel locomotive began production. Before the war the E^{l}/2, E^{mkh}/3, E^{el}, A^{akh}/9 and other diesel locomotives were built. In 1947 the TE-1 1,000 hp diesel locomotive was built, and in 1948 -- the improved TE-2 coupled diesel locomotive. In 1948 diesel locomotives began operations on the Tashkent road, the efficiency of which is as much as 28%, differing from the higher-power steam locomotive. As a result of the high efficiency, the diesel locomotive consumes fuel in an economical manner and can run 4 to 5 times as long without adding fuel as a steam locomotive. The extremely small consumption of water by diesel locomotives is extremely important in the waterless and arid regions of Central Asia. In the period under study FD, SO, E steam locomotives and the TE-1 diesel locomotive were operated on the main lines of the Tashkent Railroad. Important in handling rail freight turnover was the introduction of automatic block systems on various railroad sections, which makes it possible to increase the traffic load capacity of lines by 30% on a single track section in comparison with an electric semaphore system.

An important part was played in coping with increased freight turnover by the use of powerful main line steam and diesel locomotives as well as by adding high load capacity four-axle freight cars, making it possible to increase the weight of trains: by 1950 average weight increased by 15% in comparison with 1945. An increase in train weight made it possible to increase the carrying capacity of railroad lines with existing facilities. It aided a decrease in a number of operational expenses, a decrease in the requirements of rail transport for locomotive and train brigades, a decrease in the number of locomotives needed, expenses on heating and lighting trains. An increase in train weight increased the labor productivity of the railroad workers involved directly in freight shipments, and also cut down shipment costs. Finally, the increase in train weight made it possible to economize in capital investments necessary for increasing the traffic load capacity of individual railroad sections. However, in a number of rolling stock utilization indices during the period under study the prewar level was not achieved. Freight car turnover remained at the 1945 and 1946 level. Average daily freight car run, although it increased 22 km in com-

parison with 1945, was below the 1940 level by 51 km, and the freight train sections rate was below the 1940 and 1945 levels.

The efficient organization of mass cargo transfer is of great importance in developing the Uzbek economy. The interests of the socialist economy require cargoes to be shipped rapidly, cheaply and without loss. For the efficient utilization of means of transport and loading-unloading operations equipment containers are very important. The compactness of containers, quality of cargo packing, savings in packing materials, decrease in labor expenditures, etc., made it possible to use containers on a large scale on the Soviet railroads, particularly in Uzbekistan. Container shipments in the post-war Five Year Plan increased greatly. As a whole the increase in freight turnover, particularly of container shipments, was accompanied by mechanization of loading and unloading operations. On the Tashkent main line 18, 15, and 6-ton steam-powered cranes on railroad cars began to be used extensively, as well as gantry cranes, self-propelled motors, electric loaders, transport mechanisms and other equipment. In 1940-1950 rail freight arrivals in the Uzbek SSR increased by 38%, outshipments by 63%.

We should note that in studying the rate of freight arrival and departure growth we cannot limit ourselves to an examination merely of the sum total of increased percentage, for we must know in addition what is hidden behind each percent. One percent of the total amount of freight arrivals in 1940 was 87,000 tons, while in 1950 it was 120,000 tons, and for departures 1% was 54,000 and 88,000 tons respectively (Table 12).

As can be seen from Table 12, freight arrivals increased chiefly through coal, ferrous metals, lumber, mineral fertilizers, as well as consumer goods. After the war rail transport freight turnover increased rapidly and was handled chiefly through increasing the number of freight cars and locomotives and reconstruction of tracks. World War II demanded an immediate reorganization of the economy. The production facilities of industry, agriculture, material resources, the labor of workers, kolkhoz members and engineering-technical workers were directed toward war needs. Motor vehicles were mobilized for the army in the first days of the war. The general use vehicles available in Uzbekistan in 1943 were less than in 1940. The decrease led to a decrease in the volume of truck freight transport. In 1941 the truck freight transport figures were 10 million ton/km, and in 1943 -- 6.8 million. During World War II the number of buses also decreased. In 1943 the number was 48% of 1940, and in 1945 -- 34%. A decrease in the number of buses was accompanied by a decrease in the volume of bus passenger service. In 1940 8.8 million persons were carried by buses and 70 million passenger-km were run up, while in

1943 the figures were 0.2 and 4.0, and in 1945 -- 0.8 million persons and 7.8 million passenger-km.[5]

This was accompanied by a retrogression in their technical-economic use indices. The cost of hauling freight increased from 80.0 kopeks per t/km in 1940 to 102.8 kopeks per t/km in 1945, and passenger bus service cost from 8.2 kopeks perpassenger-km in 1940 to 20.4 kopeks respectively.[6] The war, forced ppon us by Nazi Germany, hindered the development of Uzbek motor vehicle transport.

During World War II the road system continued to expand, particularly hard surface roads. Hard surface roads in 1935 increased 13% over 1941. Maximum satisfaction of the requirements of industry and agriculture for trucking required the restoration of the pre-war level for trucks in operation and freight turnover. In 1944 the number of general use trucks in operation and in freight turnover had not only been restored but exceeded the pre-war level. The same year the number of vehicles increased chiefly through bringing in new trucks, and freight turnover[7] increased by 77%. However, the number of buses in service and bus passenger service were not restored during the war. After the victorious conclusion of the great war for the fatherland the Soviet automotive industry grew rapidly. The Minsk Heavy Truck Plant, the Kutaisi and Ul'yanovsk Motor Vehicle plants, the Odessa Plant, specializing in dump trucks, the Pavlovsk and L'vov Bus Works, etc., began production. The Yaroslavl' Motor Vehicle plant was expanded and the Moscow Compact Motor Vehicle plant was reconstructed. At all automotive enterprises new vehicles were being designed with technical and economic indices which were high for those times. The development of the automotive industry in the USSR provided a sharp impetus forward in building up the number of vehicles in service in Uzbekistan, since the influx of vehicles to the republic increased each year. This was required by the interests of restoring and developing the republic's economy. In 1945 construction began on the Surkhanskiy Highway from Termez up the Surkhan-Dar'ya Valley, serving the rayons of Surkhandar'inskaya Oblast. After the year the roads were chiefly covered with gravel, sprayed with dzharkurgan oil. Alongside the construction of new roads, old roads were improved by widening them, straightening, spraying oil and improving bad spots in accordance with the growing demands of motor vehicle transport. Up to 1945 the basic labor consuming processes in road building were carried out chiefly by hand, with the utilization of cart and mule-back. In road-building the most labor-consuming processes are earth-moving, the volume of which is usually quite large, In order to build a conventional graded road 6-7 meters wide an average of 3-5 million cubic meters of dirt must be moved per km, and even more in building the best roads. In order

Table 12*

Arrival and Departure of Major Cargo Items in Uzbek SSR Rail Transport, 1000 tons

a Наименование грузов		1940 г.	1950 г.
b Каменный уголь	c прибытие	1406	3239
	d отправление	10	1392
e Нефтяные грузы	— прибытие	801	805
	— отправление	331	1402
f Черные металлы	— прибытие	97	352
	— отправление	48	212
g Лесные грузы	— прибытие	532	1046
	— отправление	34	34
h Хлебные грузы	— прибытие	1158	1040
	— отправление	433	313

a -- Category
b -- Coal
c -- Arrival
d -- Departure
e -- Petroleum products
f -- Ferrous metal
g -- Lumber
h -- Grain

*Transport i Svyaz' SSSR (USSR Transportation and Communications), pages 70-74.

Table 13

Technical-Economic Utilization Indices for Trucking of the Ministry of Motor Transport and Roads Uzbek SSR*

Показатель	1940 г.	1946 г.	1950 г.
a Коэффициент использования автопарка, %	0,21	0,48	0,51
b Коэффициент использования пробега, %	0,69	0,64	0,57
c Коэффициент использования тоннажа, %	0,92	0,92	0,94
d Средняя длина езды, км	18,13	26,5	22,6
e Среднесуточный пробег автомобиля, км	143,2	134,2	129,6
f Режим рабочего дня, час	11,4	11,9	10,5
g Выработка на 1 списочную автомашину, т	495	505	578
h в тонна-километрах	10 045,3	13 052	13016
i Себестоимость перевозок грузов в коп. за 1 т/км	80,0	92,2	81,6

(Legend on page 56)

to mechanize labor consuming processes and increase labor productivity of road builders, as well as for increasing the rate of road constuction, the first road machine station (RMS) was organized in Tashkent, equipped with special road-building machinery. Mechanization of labor consuming jobs makes it possible to improve the quality of labor, accelerate and economize on road construction.

In 1949 RMS were organized in four more cities -- Mirzachul, Andizhan, Fergana and Samarkand. The organization of these stations made it possible to use the equipment extensively. In the building and reconstruction of roads excavators, graders, bulldozers, tamping and vibration equipment, trenching machines, rollers, mobile concrete mixers and many other types of machinery were used extensively. The organization of such stations made it possible to extend the road system in the republic, particularly roads with hard surfaces. An increase in the total length of roads, the addition of new vehicles and the incorporation of progressive operational methods were the primary factors in improving the technical-economic utilization indices for vehicles of the Ministry of Motor Transport and roads of the Uzbek SSR (Table 13).

The figures in Table 13 testify to the improvement in the general vehicle utilization during the the Fourth Five Year Plan. However, trucking costs were still high. This is explained due to shortcomings in the planning of hauls, insufficient return loads, little use of truck trailers, etc. The restoration and further development of the Uzbek economy during the fourth Five Year Plan were the basic factors in increasing trucking volume. General trucking operations of the ministry in tons increased by 28%, and 38% in t/km.

The development of new industrial regions, the development of the network of colleges and scientific research institutes in large cities caused an increase in urban bus service. The volume of bus service for the Uzbek SSR in 1950 was 13.1 million persons or 53 million passenger-km. In addition to city bus service, inter-urban bus service developed, and the volume of such service was 3.8 million persons or 47 million passenger-km in this year. Passenger service was restored and greatly exceeded the pre-war level by 1947, and passenger service volume -- in 1949. An increase in passenger service volume was also partially due to a rise in the standard of living. A further increase in the standard of living of the Uzbek people required the organization of new types of motor vehicle transport. For maximum satisfaction of the cultural requirements of the population, in 1949 taxis began to operate in Tashkent. Later taxis appeared in Samarkand, Namangan, Bukhara, Andizhan and other cities. Taxis in the republic in 1949 travelled[9] 0.98 million km, and

Legend to Table 13:
a -- Vehicle use coefficient
b -- Mileage use coefficient
c -- Tonnage use coefficient
d -- Average distance per haul, km
e -- Average daily truck mileage
f -- Workday, hours
g -- Production per truck listed, tons
h -- in ton-kilometers
i -- Trucking cost in kopeks per t/km
*Figures from the planning-economic section of the Ministry of Roads Uzbek SSR.

Table 14*

Characteristics of Primary Vessels Built During the Fourth Five Year Plan

Наименование судов	Тип судна	Мощность, л.с.	Грузоподъемность, т	Пасс. вместимость, чел.	Род топлива	Осадка в порож. состоянии, м	Осадка в груж. состоянии, м	Год постройки	Материал корпуса
Грузовой самоходный флот									
„Манас"	теплоход	75	110	—	дизтопливо	1,03	1,765	1948	сталь
Рейдовый флот									
„Маяковский"	„	100		—	керосин	0,6	0,69	1947	„
„Космодемьянская"	„	150		—	соляр-ка	0,48	0,5	1947	„
Пассажирский флот									
„Багратион"	„	140	—	20	дизтопливо			1947	„
„Сильный"	„	55	—	30	?			1947	„
„Чайка"	„	65	—	40	„			1949	„

*Figures of Central Asia State Steamship Lines

(Legend on page 60)

in 1950 -- 5.5 million km.

During the Fourth Five Year Plan truck taxi service began, with the aid of which goods were carried from various offices and institutions, individuals, etc. During the Fourth Five Year Plan the pre-war level in number of motor vehicles was achieved and the volume of motor vehicle service was increased. During the period under study truck and passenger taxis appeared, as did road building machinery stations which were extremely important for improving the road system.

During World War II water transport freight turnover dropped in the republic. This is explained primarily by a decrease in the area under cotton along the lower reaches of the Amu-Dar'ya. Cotton fiber production along the lower reaches in 1945 totalled 22% of the pre-war level. With a curtailment in cotton growing the introduction of mineral fertilizers to the soil decreased. During the post-war Five Year Plans water transport was further developed. The fleet was joined by new vessels: diesel powered vessels, steamships and motor tug launches. The auxiliary fleet was also increased in size. In 1945-1950 the tug fleet was joined by 19 non-self-propelled barges. The pre-war level of cargo arrival and departure in Uzbek river transport was restored in 1950.

During World War II the aircraft of the Uzbek Civil Air Fleet Administration played a tremendous part in hauling vital industrial cargoes, passengers, mail and in lending aid at the front. The number of planes during the first years of the war decreased due to mobilization of aircraft for the front. The pre-war level of passenger service volume, mail and baggage was restored and greatly increased during the Fourth Five Year Plan. New and comfortable IL-12 and IL-14 aircraft were added to the planes in service. Aviation became part of life in the Karakalpak SSR. Aircraft were extremely important since this area was cut off from the rail system, and roads were poor. Nukus is connected by air with almost all rayon seats in this autonomous republic. Local aviation is also well developed in Samarkandskaya and Bukharskaya oblasts, since many rayons in these oblasts are quite remote from the mail system, and roads are few and far between. Planes have successfully combatted cotton pests and other plant pests by spraying fields and orchards.

During the first years of World War II extensive changes occurred in the republic's transport: trucking and passenger service were cut down, rolling stock on hand decreased, utilization indices worsened, the direction of cargo flow changed, loading and unloading operations volume decreased greatly in rail transport, and the economic set up changed in the region served by the Tashkent main line. Beginning in the second held of the period under study an upswing began in transport

operations. The restoration of the economy and reconstruction of transport greatly increased freight turnover, the level of which exceeded the 1940 level by the Fourth Five Year Plan. The characteristic feature of the post-war period is the high rate of freight turnover growth and the technical reconstruction of transport along a broad front, as well as a significant improvement in vehicle utilization.

CHAPTER FIVE

Uzbek Transport During the Period of Great Upswing in the Socialist Economy (1951-1958)

Successful fulfillment of the Fourth Five Year Plan lay a firm foundation for a further upswing in the socialist economy. In the Fifth Five Year Plan (1951-1955) rail transport together with the entire economy was raised to a new and higher level. The directives of the 19th Party Congress called for a new and mighty upswing in the Soviet economy, further development of industry, farming and all types of transport, as well as an improvement in the Soviet standard of living. The directives of the 19th Party Congress called for efficiency in trucking operations. Great attention was devoted to a decrease in the average haul, as well as an improvement in the geographical displacement of industrial enterprises built during the Fifth Five Year Plan with the aim of bringing industry closer to sources of raw materials and fuel, as well as the elimination of inefficient and long hauls. An increase in the extraction of coal and petroleum, the production of mineral building materials and fertilizers, production of farm implements, textile and many other consumer goods on one hand and the shipment into the republic of grain and lumber, petroleum products, motor vehicles, ferrous metals and fabrics on the other, increased freight turnover on the Tashkent Main Line (Table 15). As can be seen from Table 15, the Fifth Five Year Plan also is characterized by a rapid increase in freight turnover. In 1955 freight turnover on the Tashkent main line increased 52% over 1950. The increase in freight turnover on the Tashkent main line was accompanied by an increase in the average daily load volume. We should note that in 1940 coal made up 10.4% of freight turnover along the Tashkent Road, while in 1955 it was 15%. Every increased percent in coal shipments during the Fifth Five Year plan in absolute volume was two to three times that of 1940. During the Fifth Five Year Plan the increase in coal extraction in Uzbekistan was chiefly through Angren, which increased the volume of coal shipments on the Tashkent railroad. An increase in coal extraction in Shurab, Tashkumyr, Kzylkiya and other areas also resulted in an increase in shipment volume. All of this made it possible to cut down the import of Kuznetskiy and Karaganda coal. This could not but reflect on the Uzbek economy, since long hauls of coal increase the

Legend to Table 14:

a -- Type of vessel
b -- Horsepower
c -- Cargo capacity, t
d -- Passenger capacity
e -- Full
f -- Draught
g -- Empty
h -- Loaded
i -- Year of construction
j -- Hull
k -- Self-Propelled Cargo Fleet -"Manas"
l -- Roadstead Fleet -- - "Mayakovskiy," - "Kosmodem'yanskaya",
m -- Passenger Fleet -"Bagration," -"Sil'nyy", "Chaika"
n -- diesel fuel
o -- kerosene
p -- solar oil

Table 15

Freight Turnover And Average Daily Load Increase Dynamics on the Tashkent Railroad* for 1950-1955

Показатели	1950 г.	1951 г.	1952 г.	1953 г.	1954 г.	1955 г.
a Каменный уголь	441	475	573	657	711	714
b Нефть и нефтепродукты	323	322	310	302	265	267
c Минерально-строительные материалы	378	360	422	448	517	486
d Хлопковые грузы (хлопок-сырец, хлопок-волокно, хлопковые семена)	282	333	346	316	292	272

a -- Coal
b -- Petroleum and petroleum products
c -- Mineral building materials
d -- Cotton (raw cotton, cotton fiber, cottonseed)

*Figures obtained from the registration section of the Tashkent Railroad.

cost of industrial production and loaded down the rail lines. During the Fifth Five Year Plan mineral construction material shipments increased, In 1955 the volume of mineral construction materials in freight turnover on the road totalled 1.3 million tons, that is an increase of 100% over 1950. The construction of large industrial enterprises, the development of agriculture, a growth in industrial, farm, housing, communal and other types of construction required the shipment of large quantities not only of building materials, but also of lumber, machinery, equipment, fuel, workers and food. The development of farming, particularly cotton farming, was accompanied by an increase in the volume of shipping, primarily cotton fiber, on the railroad. The development of cotton farming not only was accompanied by an increase in cotton shipments, but by the extensive incorporation of total mechanization, an increase in the production of farm implements and mineral fertilizers. The total volume of mineral fertilizers shipped into the republic in this period more than doubled. The development of cotton farming is closely connected also with an increase in oil production and refining in the republic. Well developed socialist farming in general and cotton farming in particular can exist on the basis of modern equipment and technology. The cultivation of fields, irrigation and land improvement, as well as harvesting operations are unthinkable without machinery, which require various petroleum products. Petroleum products shipments on the Tashkent railroad in 1955 increased by more then 12% over 1950. This is explained not only by an increase in oil production and its refining in the republic, but also by the large shipments of lubricants, diesel fuel, gasoline and kerosene from other economic regions. Suffice it to say that the total influx of petroleum products to the republic in 1955 totalled 1,556-000 tons as compared to 805,000 in 1950, that is, the figure almost doubled. We should note that the increase in the volume of petroleum product shipments was not only connected with the development of cotton farming, but also with the increase in the number of motor vehicles in the republic, an increase in the number of pumping stations, diesel-powered machinery, compressor units, etc. Consequently, an increase in the volume of cotton fiber shipments is accompanied by an increase in shipments of mineral fertilizers, farm implements, petroleum products, motor vehicles and consumer goods, let alone shipments of mineral building materials necessary for irrigation, housing, farm and other construction in agriculture. The development of cotton farming in the republic is accompanied by a great increase in grain shipped in from Kazakhstan, Siberia and the Altai. Calculations indicate that an increase in cotton fiber shipment volume by 100,000 tons

requires an increase in shipment of goods necessary for the development of cotton farming of 900 to 1100%.

One of the main items in freight turnover on the Tashkent main line is lumber, which is hauled chiefly from Siberia. The volume of lumber shipments along the Tashkent road in this period increased 12%. The ratio of lumber in freight turnover on the Tashkent main line during the Fifth Five Year Plan totalled 12-13% on the average. During the Fifth Five Year Plan shipments increased on cotton and wool fabrics, knitwear, clothing, underwear, confectionary goods, shoes, haberdashery, perfumes and many other consumer goods. Uzbekistan is a major supplier of fresh fruits and vegetables. Fresh fruits and vegetables are shipped in refrigerator cars to other parts of the country. In order to maintain the necessary temperature in the cars, p l a n t s were built at Arys', Kokand, Leninabad, Tashkent and other stations even earlier. In 1951 mobile ice houses began to operate. The development of grape-growing, melons and the processing of fruits gave impetus to an improvement in freight operations in the handling of fruits and vegetables. In order to improve the quality of freight handling and preserve the fruits and vegetables being shipped, since 1954 trains with machine cooling (summer) and electric heating (winter) have been used.

In 1955 coal, petroleum products, ferrous metals, lumber, mineral building materials, mineral fertilizers -- each totalled from 5 to 14% of total freight turnover. However, the leading position in freight turnover on the road (20-22%) was taken by other products: consumer goods, products of the light, food, meat packing-dairy products, textile, tanning and other branches of industry. Frequently such goods were shipped in containers. Many goods even of heavy industry, such as roofing iron, slate, roofing felt and others are also shipped in containers, which provide a high degree of protection to the goods. Container shipments during the Fifth Five Year Plan increased by almost 500%.

Such an increase in container shipments is due to the fact that the above products require expensive boxcars for rail shipment and in hauling them the load capacity of rolling stock is utilized inefficiently. Many products of the light and food industries cannot be hauled in open cars. The development of industry and agriculture furthered an increase in the standard of living of the Uzbek republic. Production ties expanded between Uzbek enterprises and cnes in other parts of the USSR. During the Fifth Five Year Plan passenger service increased. Passenger turnover in 1955 increased 53% over 1950. The increase in passenger turnover was due to a rise in the standard of living in the republic, the introduction of comfortable all-metal passenger cars -- chair cars,

second-class sleeping compartment cars and first-class pullmans. A rapid growth in direct passenger service was also aided by the opening of the All-Union Agricultural Exhibit in Moscow, extensive industrial and scientific exchanges, trial assignments and an increase in the number of students in the central cities, and in commuter service -- further development of the Angren Mining region, expansion of the Chirchik Electrochemical Combine, improvement of transport service between rayon and oblast seats, improvement of communications between twon and country.

The increase in freight and passenger turnover on the Tashkent road was handled due to an improvement in facilities on the main line and an improvement in rolling stock utilization. Experience gained in operating diesel locomotives showed their economy and advantages over steam locomotives. Conditions required the extensive utilization of diesel locomotives on the Tashkent road. In 1948 socialist industry had begun production on TE-2 diesel locomotives, which beginning in 1951 began intensive operations on the Tashkent road, the 2000 hp TE-2 locomotive not only aided in increasing train weight but also train speeds. Gross train weight in 1955 was 300 tons more than in 1950. The increase in train weight was of great economic importance (Table 16).

Rolling stock utilization improved due to the incorporation and extensive use of diesel locomotives, improvement of tracks, improvement in road traffic, efficiency in planning freight shipments, extensive utilization of best labor methods, etc. An increase in train weight and improved speeds for heavy trains are possible only if the tracks can carry the load. Therefore, in the fifth Five Year Plan further track improvement was made. By 1955 heavy rails, chiefly Ia, lay on two-thirds of the main lines. An increase in the length of main lines with heavy R-43 and Ia rails was accompanied by a decrease in the length of sections with light-type rails. In order to increase the strength and stability of the track of great importance is a ballast-layer which evenly distributes the pressure from the ties, without leeting them be pressed into the earthbed. Gravel ballast, and particularly rock, contains a number of advantages over sand ballast: they possess greater resilience and drain easily, protecting the earthbed from freezing, etc. The length of main line on gravel ballast by 1955 had increased by almost 25% over 1950. In order to strengthen the tracks and allow the passage of high-speed, heavy trains it is necessary to increase the number of ties per km. In 1955 the length of main lines with 1,840 ties and more per km increased by more than 400%, and with from 1601 to 1839 -- 70% over 1950.

On one of the sections of the Tashkent main line a

central dispatcher operations point began to operate in 1953, with which train traffic was directed from one post. This made it possible not only to increase the traffic capacity of the lines, but also increases line safety and frees a large number of station masters and switchmen. During the fifth Five Year Plan various road sections were equipped with automatic block systems, with the aid of which train traffic control was achieved automatically, depending on the traffic in that section. The total length of sections equipped with automatic blocking systems during the Five Year Plan increased by more than 250%. During the Fifth Five Year Plan (from 1952) diesel locomotives were utilized extensively on the Tashkent road. The FD series steam locomotive was removed from service and transferred to other roads. In the process of carrying out this Five Year Plan for the development of the Soviet economy two railroad lines were completed: Mointy-Chu and Chardzhou-Kungrad. The Mointy-Chu line provided a new route from Karaganda to Kazakhstan and Central Asia. In addition, it eased traffic on the Kazakh Railroad (former Turksib) and cut down hauls from the Karaganda and Omsk roads to the Central Asian republics. The area along the lower reaches of the Amu-Dar'ya, cut off from the railroad system, was linked by rail during the Fifth Five Year Plan, although the problem of building a railroad along the lower reaches of the Amu-Dar'ya was discussed in the press as early as the last century. The Chardzhou-Kungrad[1] Line is of great economic significance. It joined the Karakalpak ASSR, Tashauzskaya and Khorezmskaya oblasts with the administrative and industrial centers of the Central Asian republics. In addition, this line linked the lower reaches of the Amu-Dar'ya to Kazakhstan, the Urals, Siberia and the European part of the union and regularized economic ties between these regions, eliminating the seasonal nature in freight shipments. The Chardzhou-Kungrad Line radically changed the face of the lower reaches of the Amu-Dar'ya, pushing forward the development of industry and agriculture in this area. In this period one section was double tracked to handle increased freight turnover. Consequently, freight turnover on the Tashkent main line during the Five Year Plan increased greatly and required improved road facilities. In order to handle the increased freight many methods of increasing the traffic capacity of railroad lines were used.

The development of industry and farming in Uzbekistan in subsequent years, a great increase in electric power output, coal and oil production, mineral fertilizers and building materials placed great demands on rail transport. The directives of the 20th Party Congress for the Development of the Economy for 1956-1960 called for a further improvement in

Table 16

Tashkent Railroad* Rolling Stock Use Indices For 1950-1955

Показатель	1950	1951	1952	1953	1954	1955
a Оборот грузового вагона, сутки	5,93	5,6	4,91	4,61	4,49	4,0
b Коммерческая скорость движения грузового поезда, *км/час*	16,1	17,9	20,6	21,4	20,9	23,0
c Среднесуточный пробег паровоза в грузовом движении (включая передаточные и вывозные поезда), *км*	206,5	210,6	220,6	231,2	227,3	253,6
d То же, тепловоза	216,8	219,7	218,6	257,6	287,6	360,6
e Среднесуточный пробег грузового вагона, *км*	136,2	146,9	159,1	170,8	165,5	191,2
f Процент порожнего пробега вагонов к груженому, %	42,1	40,4	38,3	38,2	38,1	37,9
g Динамическая нагрузка на ось груженого вагона, *т*	8,40	8,35	8,57	8,74	8,89	9,14
h Средний вес грузового поезда брутто, *т*	1359	1425	1476	1602	1640	1719

a -- Freightcar turnover, days
b -- Commercial Freight train speed, km/hr
c -- Average daily freight train steam locomotive mileage, (including transfer and outgoing trains), km
d -- Same for diesel locomotives
e -- Average daily freight car mileage, km
f -- Mileage percentage of empty cars to loaded
g -- Dynamic per-axle loaded freight car load
h -- Average gross freight train weight
*Figures from the Planning-Economic Section of the Tashkent Road.

Table 17

Tashkent Railroad Rolling Stock Utilization Indices for 1956-58

Показатель	Единица измерения	1956	1957	1958
b Оборот вагона	сутки	3,89	3,42	3,84
c Коммерческая скорость	км/час	35,8	36,8	37
d Среднесуточный пробег паровозов в грузовом движении (включая передаточные и вывозные поезда)	км	251,9	265,8	244,2
e То же для тепловозов	км	403,9	498,5	496,0
f Среднесуточный пробег грузового вагона	км	206,5	182,8	175,5
g Отношение порожнего пробега к груженому	%	42,7	43,0	47,6
h Динамическая нагрузка на ось груженого вагона	т	9,39	9,75	10,1
i Средний вес грузового поезда брутто	т	1767	1576	1636

(Legend on page 72)

the technical level of rail transport. In 1956-1958 a number of added measures were carried out on the Tashkent road to improve and rebuild facilities, new roads were built, sections were double-tracked, stations and junctions were developed, etc. Freight turnover on the Tashkent main line continued to grow. In 1956 it totalled 20.5 billion tariff ton-km, in 1957 -- 21.6, and in 1958 -- 18.5. A decrease in freight turnover on the Tashkent main line is explained by the fact that the transit line from Dzhusaly-Chengel'dy, which had more traffic, was transferred to the Kazakh Road, and less heavily loaded road sections were added to the Tashkent Road -- Kagansk and Stalinabad. Since 1 August 1958 the Tashkent Road has been operating within new limits -- it connects with the Ashkhabad Road at Khodzha-Davlet Station and the Kazakh Road at Chengel'dy.

The increased freight turnover was handled by using more powerful main line diesel locomotives. In April 1956 the new 4000 hp TEZ series mainline dual-unit diesel locomotive entered service on the road. This locomotive was one of the deciding factors in increasing train weight and aided in increasing the carrying capacity of railroad lines. The incorporation of the TEZ locomotive was accompanied by further strengthening of the tracks, and the equipping of certain sections with automatic block systems. The technical reconstruction of all railroad facilities, particularly the replacement of steam locomotives by diesel on the one hand, and the intelligent utilization of transport facilities on the other made it possible to improve rolling stock utilization (Table 17). The increase in empty mileage is explained by the low level of empty car arrangements, planning shipments and small number of doubled operations at stations. In 1956 the Party and government assigned the Uzbek and Kazakh peoples a new job -- the farming of the Golodnaya Steppe. In view of the job of farming the entire Golodnaya Steppe it became necessary to extend the railroad from Dzhizak Station to Syrdar'inskaya Station. Although the traffic capacity of the Tashkent Road sections contiguous to the Golodnaya Steppe had increased greatly in recent years, nevertheless it did not complete provide for the development of rail transport on the steppe, since the existing system did not run across the steppe itself, but intersected merely the edges. In 1957 construction began on the Dzhizak-Syrdar'inskaya Railroad across the Golodnaya Steppe, 110 km in length. This line is important in the conquest of the steppe.

During the years of Soviet authority Socialist rail transport increased greatly and was furnished with modern equipment. This made it possible to handle Tashkent Railroad freight, which had increased more than 1400% between 1913 and

1958. In order to improve freight planning, the strengthening of interrepublic economic ties, the direction of industry and construction, the organization of sovnarkhozes was extremely important.

Reorganization of the administration of industry and construction and the organization of local sovnarkhozes exerted positive influence on rail transport operations. The transfer of many plants and factories to the sovnarkhoz made it possible to improve the quality of planning freight operations, which was aided to an even greater degree by the expansion from year to year of the variety of goods planned locally by sovnarkhozes. This made it possible to eliminate cross-hauls and long hauls by rail, cutting down transport costs in the economy. We shall cite one example: up to 1957 building materials -- bricks, lime, alabaster -- were often shipped on cross-hauls on the Tashkent Railroad. Many plants of various Ministries and departments were producing building materials, and these plants were shipping building materials to their construction jobs, not taking into consideration the normal freight flow and haul distances established by the administration of the Tashkent Road. Up to 1957 Isfara Station shipped alabaster according to the plant standards of Minmetallurgkhimstroy and Kaufmanskaya Station -- according to planned standards of Mintransstroy. The former station shipped to cities in the Fergana Valley, Tashkentskaya Oblast and to the Kazakh SSR. The latter shipped to Tashkentskaya and Samarkandskaya oblasts and the Fergana Valley -- counter to the flow running from Isfara Station.[2] Freight on the Kaufmanskaya-Ursat'yevskaya-Mel'nikovo Section was cross-hauled 261 km. Of course these cross-hauls, as other inefficient freight operations, caused loss to the economy. Due to the organization of sovnarkhozes, the plants of various ministries and departments building construction materials were transferred to the sovnarkhozes, which organized planned shipments of building materials, and this led to a curtailment of inefficient shipments of building materials. The furnishing of the Tashkent main line with new equipment and reorganization of the administration of industry and construction made it possible to handle an increased volume of freight, increasing labor productivity and decreasing transport costs in the economy. The constant increase both of freight and passenger service on the Tashkent main line could not but influence an increase in station operations. Rail transport operations depend on the harmony in railroad station operations. During the years of Soviet authority large freightyards and section stations were built in the republic, furnished with modern equipment and capable of processing several thousand cars per day. The major railroad stations in Uzbekistan are Tashkent Freight,

Tashkent Passenger, Ursat'yevskaya, Kokand, Andizhan, Samarkand, Kagan, and Kzyltukumachi stations. The Tashkent freight yards are the major ones for sorting cars for north and southbound trains. The station has dozens of sorting tracks for processing cars. The volume of sorting operations is quite large -- thousands of cars are handled each day. In 1960 the number of cars[3] processed each day was 23% over 1957. Up to 1957 sorting was handled by series E steam locomotives. The locomotive proved uneconomical in switch work. Since 1957 the TE-1 diesel locomotive has been used in switching operations. The continual increase in switching volume and inefficiency of steam locomotives in this work made it necessary to utilize diesel locomotives extensively in switching operations at the Tashkent yards. In 1957 four series E steam locomotives and two TE-1 diesels were used in switching operations, and in 1960 -- only series TE-1 and TGM-3 diesels. Switching operations not only at the Tashkent yards but at other large stations on the Tashkent main line are handled by diesels. The use of diesels for switching operations has many advantages over steam locomotives. In diesel switching operations the fire danger is greatly decreased. This is quite important particularly in conditions whereby a diesel is operating on industrial plant spur lines, at plants, factories and warehouse yards of clients. In the diesel switch engine the brake system is improved over the steam engine. Therefore the time required to gain momentum and slow down is considerably less. A steam locomotive needs servicing twice in every 24-hour period, which cuts down the actual work time in switching operations. A diesel locomotive needs servicing only once a week. A diesel can handle a larger train than a steam switch engine. This is important for speeding up the process of assembling and disassembling trains, cuts down the time cars stand idle and cuts down the time freight spends in cars. In addition, the diesel has a greater maneuverability. All of this made it possible to cut down operation expenses for switching operations by the Tashkent yards. In 1959 the cost per switching hour for the series E steam locomotive was 5.3 rubles, and with the TE-1 diesel -- 4.8 rubles[4]. Radio communications are used extensively in switching operations, making it possible for the switch dispatcher to transmit instructions to the switch engine and train assembler. Switch engines are equipped with radio units, and sorting tracks with loudspeakers.

The relatively high maneuverability in yard operations is justified by the fact that it can simultaneously receive trains from Salar, Tashkent Passenger Station and Kzyltukumachi. Rail transport reflects all changes in the development of the economy. The large flow of transit freight through our

republic, north and southbound, the rapid growth of industry, particularly in Tashkent, as well as Chirchik, could not but seriously influence the gradual formation of the Tashkent Junction, which at present is one of the largest in the country. The Tashkent freight yards, Tashkent passenger station, Salar, Kzyltukumachi, and the by-pass route between Tashkent Yards and Kzyltukumachi and Khamza Station built on it, form the Tashkent Railroad Junction. From the north and south double track lines come to Tashkent, Tashkent passenger station is separate from the Tashkent freight yards, switches are operated electrically from a central point, etc. In addition, in view of the continual increase in incoming and outgoing freight, Khamza Station was opened in 1958 for taking the load off the Tashkent freight station. Khamza is used chiefly for loading and unloading trains of the Tashkent Junction.

Ursat'yevskaya -- a major junction station -- is located at the junction of three railroad lines -- Tashkent, Fergana and Kagan. The station assembles and disassembles trains for these lines and has a number of sorting tracks and freightyard. Here, as at Tashkent Freight Yards, radio communications are used extensively in switching operations. Characteristic incoming cargoes are coal, petroleum products, lumber, building materials, and outgoing -- wine, ferrous metals and canned goods. The industrial spur lines of Zagotzerno and the petroleum bulk plant adjoin Ursat'yevskaya Station. The station possesses a roundhouse. Samarkand Station is a large section station. Its freight turnover is rather large. The characteristic incoming freight include coal, petroleum products, ferrous metals, lumber, buildings materials, mineral fertilizers. Outgoing freight includes cotton fiber, cottonseed, spare parts for tractors, tea, canned goods, movie and radio equipment, beer, dry fruits, wine, vodka and macaroni products, clothing, underwear and other consumer goods. The station contains a reversing depot. Kokand also contains a section station. Here trains are assembled and disassembled. The station is equipped with a yard, which improves its operations. Characteristic outgoing freight includes building materials, mineral fertilizers, wine and vodka, cottonseed oil, cotton cake, cottonseed; incoming -- coal, petroleum products, lumber, farm implements, fabrics and grain. Kagan contains a major sorting station, is located at the junction of three lines -- Samarkand, Karshinskaya and Chardzhuyskaya. The station assembles and disassembles trains for these destinations and has dozens of sorting tracks. Radio communications are used extensively in switching operations, and the station contains a basic locomotive depot. The station has a freightyard. Characteristic incoming freight includes grain, petroleum products, coal, farm imple-

ments, textile products, lumber and motor vehicles; outgoing -- wool, cottonseed oil, cotton fiber, livestock products, etc. Arys' contains a major sorting station for the Kazakh main line and is located in the Kazakh SSR, but it plays an important part in the operations of the Tashkent Railroad. The interregional transport-economic links between Uzbekistan and the European part of the USSR, Siberia, Kazakhstan and the Far East are carried out through this station. Arys' station is located at the junction of three lines, Tashkent, Turkestan and Chimkent. Correspondence toward these destinations runs through Arys' Station. In a 24-hour period dozens of freight trains pass through, plus many transit passenger trains (both directions). At the station freight cars are sorted in large numbers, trains are assembled and disassembled to and from the south, north and west. The station is equipped with electric switch centralized operations, and the sloping freight yards are completely mechanized, providing automatic slowing down of the freight cars. The sorting tracks are equipped with dwarf semaphores and loudspeakers. Radio is used extensively in switching operations. Passenger transit trains through this station according to a schedule, rapid makeup and breakdown of trains, as well as continuous supply of ice to refrigerator cars will greatly improve operations on the Tashkent main line. Steam-powered cranes mounted on railroad cars with a hoist capacity of 18, 15 and six tons are used extensively at these stations for loading and unloading operations, as well as loading trucks, electric trucks and other equipment. A large number of industrial spur lines join these stations and container areas are provided.

In Uzbekistan the length of railroad lines during the five year plans has increased greatly. In 1913 present day Uzbekistan had 1,300 km of railroad lines, while in 1940 it had grown to 1,900, in 1956 -- 2,200, in 58 -- more than 2,238 km. The density of rail lines per 100 square km in Uzbekistan is 0.56 km. In view of the construction of large industrial enterprises in the republic the length of general use lines has increased, but also industrial spur lines. The organization of freight shipments between railroad stations and major industrial enterprises by truck is extremely difficult and involves tremendous cash and material expenditures. Most of the freight flow originates at industrial enterprises. Therefore, during the five year plans numerous spur lines were built from railroad stations to industrial enterprises. The rapid development of industry and agriculture, culture, science, and art on the one hand, and the continuous rise in the standard of living of the peoples of Uzbekistan on the other, could not but influence passenger service. In 1950 the total number of passengers riding the

Tashkent railroad was 8.7 million persons, in 1955 -- 11.5 million and in 1958 -- 8.5 million. The increase in passenger service was aided also by the acquisition of all-metal cars, an increase in train speed and an improvement in passenger services en route. Before the war the Moscow-Tashkent passenger train took five days and nights, after the war four days and four nights, and right now only seventy-two hours.

This is a result of increasing the speed of trains on individual runs, using more powerful locomotives and rebuilding the tracks, as well as decreasing the number of stops and time spent standing in way stations. The decrease in passenger service volume since 1957 is explained by the development of improved and more comfortable types of transport. The TU-104 jet passenger plane has been used since October 1956 for long-distance passenger service. A decrease in rates on the local airline in 1956 and 1957 caused a shift of passengers from rail to air transport and, finally, the extensive use of comfortable buses between cities and oblasts led to a decrease in suburban passenger service (Table 18). The decrease in transit passengers since 1958 is explained by an increase in the number of flights daily on the Tashkent-Moscow jet run and other lines, as well as a rate decrease on the air lines. Passenger flow in the republic begins chiefly in the three most highly developed regions -- Tashkent -Fergana and the southwest. The primary passenger lines in the republic are Tashkent-Ursat'yevskaya, Ursat'yevskaya-Kokand-Andizhan, Andizhan-Dzhalalabad and Ursat'yevskaya-Samarkand-Kagan. The Tashkent-Ursat'yevskaya railroad section has the greatest frequency of passenger trains, since local and transit trains on the Tashkent main line pass along this section. The main passenger service line in the republic is Tashkent-Moscow. Passenger service, less in volume in comparison with the Moscow line, is offered between Tashkent and Novosibirsk, and an even smaller volume of passenger service between the resort areas of the Caucasus. Suburban passenger service had developed in Tashkentskaya, Andizhanskaya, and Samarkandskaya oblasts. An improvement in passenger service will be aided by the reconstruction of the Tashkent station, which began in 1957, to become completed during the Seven Year Plan. In order to provide safety and convenience for passengers a two-way tunnel has been dug under the railroad tracks with exits onto the various platforms and the station building itself. The importance of the Tashkent passenger station is quite significant in organizing passenger service. This is apparent from the fact that the daily number of passenger trains at Tashkent passenger station is 30 pairs of trains -- express, local and long-distance runs. The rapid development of industry, agriculture, the culture and economy of Tashkentskaya Oblast was the pri-

Legend to Table 17 (on page 65):
a -- Unit of measurement
b -- Car turnover
c -- Commercial speed
d -- Average daily freight train steam locomotive mileage (including transfer and outgoing trains)
e -- Same, for diesel locomotives
f -- Average daily freight car mileage
g -- Ration of empty mileage to loaded
h -- Dynamic per-axle loaded car load
i -- average gross freight train weight
j -- 24 hours
k -- km/hr
l -- ton
*Figures from the Accounting Section of the Tashkent Railroad.

Table 18

Passenger Service by Category in 1955-1958, 1000 persons*

	Виды сообщения	1955	1956	1957	1958
a	Прибытие пассажиров, прямое сообщение	1148,8	1138,4	1243,1	1218,3
b	Транзит	769,9	778,1	837,9	443,0
c	Отправление:				
d	прямое сообщение	1081,9	1102,4	1201,8	1199,5
e	пригородное сообщение	3602,5	2771,2	2608,6	2510,3
f	местное сообщение	4950,7	4288,5	3562,1	3185,9
g	По всем сообщениям	9635,1	8162,1	7372,5	6776,7
h	Перевезено пассажиров по всем сообщениям	11553,8	10078,6	9453,5	8029,0

a -- Passenger arrivals direct service
b -- Transit
c -- Departures
d -- Direct service
e -- Suburban service
f -- Local service
g -- All categories
h -- Total passengers for all categories
*Figures from the accounting section of the Tashkent Railroad.

mary cause for the rapid increase in suburban passenger service. The basic suburban sections on the Tashkent railroads are Tashkent-Syrdar'inskaya, Tashkent-Angren, Tashkent-Barrazh; Andizhan-Tentyaksay, Karshi-Kitab, etc. Every 24 hours there are seven suburban train arrivals and departures at the Tashkent passenger station. Rail transport has played a great part in the mighty upswing in the Socialist economy. During the Fifth Five Year Plan motor vehicle transport has been extensively developed for maximum satisfaction of the growing requirements of industry, agriculture and the general public for trucking services. Further development of the Soviet automotive industry has increased the influx of new trucks to the republic. The total number of trucks and buses has increased, which has aided in increasing the freight and passenger service volume. The total number of trucks increased 1350% during the fifth Five Year Plan, buses 250%, freight hauls increased 2200%, freight turnover 1500%, bus passenger service runs almost 600% and passenger turnover more than 500%. Freight and passenger taxis also increased operations, and the 1955 volume totalled 26,200 paid passenger-km and 6,837 paid ton/km. Together with the increase in number of vehicles, the road system improved. During 1950-1955 the Zeravshanskiy Highway was built and partially reconstructed on the Samarkand-Kattakurgan-Navoi (Kerminye)-Kzyltepe Section. In 1952-1954 the Nukus-Khalkabad road-landing (with branch to Takhiatash) in the Karakalpak ASSR was built. In 1955-1956 construction was completed on the following section of the Karakalpak Highway: Khalkabad-Chimbay. The Karakalpak Highway runs from the city of Turtkul' along the right bank of the Amu-Dar'ya through Biruni, Jukus to Chimbay, Karauzyak and Takhtakupyr. The road then runs to the northeast to Kzyl-Ordy in the Kazakh SSR.

In the Fifth Five Year Plan and subsequent years both truck and bus operations improved. An increase in the number of bus runs was furthered by the building of comfortable buses. In 1957 construction began on new buses; the ZIL-158 at the Moscow Motor Vehicle Plant imeni Likhachev and the LAZ-695 at the L'vov Plant. These buses have a large seating capacity, are laid out better, have better ventilation and a number of other advantages over the ZIL-155 bus. Substantial changes have taken place in recent years in automobile construction. in 1956 the Moscow compact vehicle plant began producing the Moskvich-402. In 1957 mass production began on the Volga. In 1956 testing was successfully conducted in Tashkent on the 32-seat bus from the Moscow Likhachev Plant. At the beginning of 1956 bus service began between Fergana-Yaz"yavan-Dzhumashuy-Tyuryakurgan and Namangan. This line runs along a newly built road through the Central Fergana, extending 100 km. Later

comfortable buses began to run along the following routes: Khatyrchi-Lyangar, Kattakurgan-Zirabulak, Denau-Saryassiya-Shargun', Serovo-Mitan-Sokh. In 1955 bus service increased significantly between the cities and villages of Uzbekistan. In the second quarter of 1956 a new line opened, joining Samarkand with Bukhara, later the Samarkand-Dagbit-Chelek-Narimanov Line. GAZ-12 and M-20 taxis operate on lines linking Tashkent with Chirchik, Chimkent, Samarkand and Almalyk. In 1957 the ZIL-127 bus began to run along the Tashkent-Bukhara and Tashkent-Yangiyer and Tashkent-Fergana Line. Close economic ties between the fraternal Central Asian republics also had an effect on bus service. In 1958 bus service was set up between Samarkand and Pyandzhikent, Stalinabad and Termez (via Denau), Urgench-Terhauz, etc. Farming of the Golodnaya Steppe also furthered an increase in the Uzbek road system. By the spring of 1957 52 km of new roads had been built on the steppe and a truck and auto depot had been set up. By 1959 more than 115 kilometers had been built. Farming of the Golodnaya Steppe also caused a necessity of setting up bus service along the Tashkent-Yangiyer route, which to a great degree increased the frequency of bus service along the Tashkent-Ursat'yevskaya road. In the period under study Uzbekistan became covered with a network of bus routes. In 1958 the total length of bus routes in the republic was 14,000 km. The most heavily traveled bus routes are Tashkent-Yangiyer, 141 km long, Tashkent-Samarkand-- 340 km, Bukhara-Gizhduvan -- 47.5 km, Tashkent-Angren -- 114 km, Tashkent-Chirchik--- 30 km, Andizhan-Voroshilovsk -- 58.5, Namangan-Dzhumanshuy -- 35km, Kokand-Tashkent -- 230.4, Fergana-Kokand -- 101 km, etc. Bus routes not only interconnect large cities: they also join all oblasts of the republic with their oblast seats. In addition, almost all oblast rayon seats are also interconnected by bus routes. For example, Ferganskaya oblast contains 18 bus routes[5], Samarkandskaya -- 34, Khorezmskaya -- 12, Tashkentskaya -- 62, etc. In 1958 there were a total of 234 bus routes in the republic, along which ran 600 buses, and passenger service totalled 1,448 million passenger-km. Modern and comfortable ZIL-155, ZIL-127 and LPZ-695 buses have been placed on the republic's bus lines (Table 19).

The ZIL-127 bus was designed for interurban long distance passenger runs. In 1952 the Toytyube-Akhangaran road was partially reconstructed, and in 1956 the construction of this road was completed up to the city of Angren. The Tashkent-Akhangaran-Almalyk-Angren road is hard surface all the way and is used extremely heavily for trucking and bus service, lightening considerably the load of the Kzyltukumachi-Angren Railroad line. In order to satisfy the transport needs of the Fergana Valley the road system was extended here also.

Table 19

Primary Figures on Buses in Service on Uzbek Lines

Показатель	h Автобус				
	ЗИЛ-155	ЗИЛ-158	ЗИЛ-127	ПАЗ-652	ЛАЗ-695
a Число мест для сидения	28	32	32	23	32
b полное	52	60	—	44	57
c Максимальная мощность двигателя, *л. с.*	95	109	180	90,0	109
d Максимальная скорость, *км/час*	65,0	65,0	95,0	70,0	65,0
e Контрольный расход топлива при скорости 40—50 *км/час*, *л*/100 *км*	33,0	37,0	40,0*	28,0	36,0
f Вес автобуса в снаряженном состоянии, с нагрузкой пассажиров, *кг*	10190	10840	13000	7500	10775
g Размер шин	10,0—20	11—20	320—20	8,25—20	10,0—20

a -- Seats
b -- Total capacity
c -- Maximum horsepower
d -- Maximum speed, km/hr
e -- Checked fuel consumption at 40-50 km/hr, l/100 km
f -- Bus weight loaded, kg
g -- Tire size
h -- Bus

*Checked fuel consumption for ZIL-127 bus indicated at speed of 70 km/hr.

In 1953-1954 new roads were built through the new farm lands of the central Fergana: Margelan-Yaz"yavan, Yaz"yavan-Nasretdinbek, Dzhumashuy-Karakalpak Station, Stalino-Nasretdinbek, Yaz"yavan-Shakhandskiy Bridge, etc. Considering the constantly increasing volume of service and the high degree of traffic intensity, in 1954-1955 the approach roads to Tashkent along the Chirchik and Khilkov highways were hard-surfaced. The shortest route between Leninabadskaya Oblast and Tashkent is the Tashkent-Leninabad road, which follows the Almalyk Road in the Tashkent-Toytyube section. The road runs via Pskent and near the village of Kukaral enters Leninabadskaya Oblast. The road is not only important for suburban service but also for maintaining economic links between Tashkentskaya Oblast, Leninabadskaya Oblast and the Fergana Valley.

Table 20

Technical-Economic Vehicle Use Indices for Trucking Operations of the Ministry of Motor Transport and Roads Uzbek SSR*

Index	1950	1955
Vehicle use coefficient	0.51	0.53
Mileage use coefficient	0.57	0.56
Tonnage use coefficient	0.94	0.96
Average run, km	22.6	16.0
Average daily vehicle mileage, km	129.6	171.0
Workday schedule, hours	10.5	10.7
Output per registered vehicle, ton	578	1103
In t/km	13016	17603
Trucking costs, kopeks per t/km	8.16	5.58

*Figures of the Planning-Economic Section of the Ministry

In the period under study interrayon and interkolkhoz roads were improved, and total mileage of improved dirt and graded roads was increased. The total length of union, republic and local roads in Uzbekistan by the end of 1955 was 27,800 km. The extension of the road system with hard surface roads aided in handling not only the increased freight flow but also resulted in an improved vehicle use (Table 20). As is apparent from Table 20 the technical-economic indices in the period under study were improved. An improvement in the condition of roads was one of the factors in decreasing trucking costs. During this period passenger bus service costs decreased, as well as taxi operational costs. The cost of hauling passengers by bus decreased from 1.09 kopeks per passenger-km in 1952 to 0.62 kopeks in 1955, and the

cost of taxi operation dropped from 9.340 kopeks per km to 7.42. In five years the cost of trucking decreased by almost 2.6 kopeks per t/km. The decreased cost is due to an improved utilization of the carrying capacity of the trucks, the use of truck trailers, good service and maintenance, improvement in roads, as well as skillful handling of trucks. An improvement in vehicle utilization was aided by an improvement in the theory of motor vehicle operations. Various theses, rules, and standards were worked out and ratified, which aided in regulated in planning and organization of trucking operations, mutual responsibility of transport organizations and clients, improved organization of service and maintenance. The building of good roads aided in increasing interurban passenger bus service by 400%. A concentration of large industrial enterprises and schools, as well as the population growth sharply increased urban bus service. This service increased 580% during the period under study. In 1955 centralized truck delivery of mass freight began. The essense of centralized shipments consists in the fact that the organization of trucking and vehicle operations are carried out by a single motor vehicle transport enterprise according to a previously worked out schedule, the loading of the vehicles is handled by the shipper, and the unloading by the consignee. Operational expenses are paid by the shippers or the transport enterprise. The main feature of centralized shipments consists in the fact that they free the consignee from a function which is not inherent to him -- goods delivery, as a result of which he can devote all of this attention to primary production activities. Due to the fact that in the organization of centralized shipments, loading and unloading are handled by the shipper and consignee, there is no necessity to take loaders and agents along in trucks.

This progressive method made it possible to improve the transport process, particularly the introduction of dispatchers and trucking schedules. The introduction of centralized shipments aided in improving vehicle use: long periods of standing around by trucks awaiting loading was curtailed, and labor productivity of truck drivers was increased, and the number of trucks necessary for handling a given quantity of freight was cut down, as was the number of expediters, and trucking costs decreased. Centralized truck shipments in the Uzbek SSR in 1955 totalled 9.0 million tons, and in 1958 -- 24.4 million.[6] The centralized system of truck shipments in comparison with goods delivery by the trucks of the consignee provides for the same volume of goods transfer an increase in labor productivity of 150 to 200% in all areas of the transport process (loading, transfer, accompaniment and unloading), and a decrease in trucking costs. In 1958 all cotton cleaning

mills in the republic, the majority of meat and fat combines and brick works, all construction organizations Glavtashkentstroy, etc., were served by centralized trucking operations. Since general use vehicles are all owned by specialized trucking enterprises, with the same operations conditions they provide higher vehicle use indices and a great decrease in trucking costs. In spite of the definite savings caused by centralized shipping, the ratio of this form of trucking in total drayage operations is too low. In 1955 the percentage of centralized trucking operations was 13.1, and in 1958 -- 18.2. For the extensive application of centralized trucking operations, great importance is attached to the setting up of mechanized quarries in Fergana, Andizhan, Namangan, Samarkand and Bukhara, the timely dispatch and loading of freight by shippers, a decrease in rates for hauling freight by public trucking enterprises and a further unification of motor vehicle facilities of all ministries and departments within the system of the Uzbek SSR Ministry of Motor Transport and Roads. Public trucking operations were further developed in 1956 and in subsequent years. Seventy-four trucking firms handled freight operations in 1956, joined into oblast trusts and the Karakalpak ASSR Ministry of Motor Transport and Roads. In 1956 the transport firms were broken up into the following specializations: 35 handling trucking operations, 2 in buses, 4 with taxis and 33 mixed. The further development of the economy of the republic led to an increase in trucking operations and bus service (Table 21).

Table 21

Trucking Operations and Bus Service Volume
For the Uzbek SSR Ministry of Motor Transport and Roads

	1956	1957	1958
Trucking operations:			
a) by tons, million t	30.0	34.7	43.7
b) by t/km, mil. t/km	394.7	490.4	584.0
Bus service:			
a) by passengers, mil. persons	177.7	162.4	187.8
b) by passenger-km, mil. passenger-km	1051.0	1195.6	1520.4
Taxis, million paid passengers/km	27.3	19.1	21.8
Freight taxis, million paid t/km	12.5	18.8	18.2

As the table indicates, trucking in t/km in 1949 increased by almost 50%, bus service also increasing by 50% in comparison with 1956. The increased volume of service was handled by increasing the number of vehicles, improving roads and expanding the road system with hard surface roads. In addition, an improved utilization of motor vehicles by the ministry was of importance (Table 22). Small departmental motor pools existed in the republic before the organization of public trucking and bus facilities. Each state enterprise created its own motor pool. There are many in the republic; the majority are small. In small motor pools vehicles are used extremely inefficiently (Table 23).

In comparing the figures of Table 22 and Table 23 the inefficiency of small departmental motor pools becomes quite evident. Experience has shown that in small motor pools the vehicles are not used efficiently. Each customer receives goods from the supplier independently. Frequently trucks stand around waiting to be loaded, and empty runs are made since it is impossible to load the trucks with return hauls. This is due to the fact that the trucks belong to one enterprise and the freight to another. The mileage use coefficient here does not exceed 0.51, and output per registered vehicle ton is 700 tons and 9000 t/km on the average per year with a cost of 7.0-8.0 kopeks and more. Reorganization of the management of industry and construction carried out at the initiative of the Party created favorable conditions for improving transport operations. A shift from former organizational forms of administration -- via branch industries and departments to new forms of administration -- according to the territorial principle through sovnarkhozes -- creates conditions for eliminating small departmental motor pools and enlarging average ones, which will make it possible to improve planning in trucking operations and increase the ratio of public use trucking. The organization of sovnarkhozes and large units under them furthered a more efficient utilization of available vehicles (Table 24).

The sovnarkhozes of the republic had at their command a large number of vehicles. For example, the Tashkentskiy Sovnarkhoz had several thousand trucks. The high cost of trucking in the Karakalpak sovnarkhoz is due to the poor condition of the roads. A futher amalgamation of truck facilities and the extensive application of centralized shipping operations will enable us to make efficient use of the advantages of the socialist planned system of economy in the republic. The great increase in the republic of trucking (trucks haul 2½ times the amount of freight hauled by the railroads and waterways) and the availability of highly skilled workers and engineering-technical personnel have created a very real

Table 22

Technical-Economic Motor Vehicle Transport Operations Indices for the Ministry in 1956-1958

Показатель	Грузовые перевозки			Автобусные перевозки		
	1956	1957	1958	1956	1957	1958
а Коэффициент технической готовности парка, %	0,716	0,713	св. нет	0,816	0,807	св. нет
б Коэффициент использования парка, %	0,508	0,52	0,54	0,664	0,632	0,646
в Коэффициент использования тоннажа (вместимость), %	0,956	0,982	0,99	0,848	0,88	0,843
г Коэффициент использования пробега, %	0,543	0,548	0,53	0,947	0,954	0,949
д Среднесуточный пробег, км	180	189,6	186,7	238,2	241,2	253,2
е Режим рабочего дня, час	10,7	10,7	10,1	18,4	13,3	13,2
ж Выработка на 1 автомашину (пасс. место):						
з а) в *т* (пасс. место)	1340	1396	1509,5	7700	6360	св. нет
и б) в *т/км* (пасс/*км*)	17388	19392	20156,6	46450	46810	47712
к Себестоимость перевозки 1 *т/км* (1 пасс/*км*), коп.	5,2	5,10	5,30	6,1	6,1	6,5

a -- Vehicle condition coefficient (ready for use), %
b -- Total vehicle use coefficient, %
c -- Tonnage utilization coefficient, %
d -- Mileage utilization coefficient, %
e -- Average daily mileage, km
f -- Schedule, hours
g -- Output per vehicle (seat)
h -- In t (seat)
i -- In t/km (passenger/km)
j -- Cost per t/km (passenger/km), kopeks
k -- Trucking
l -- Bus service

Legend to Table 23 (following page):

a -- Motor pool groups (no. of vehicles)
b -- Vehicle utilization coefficient
c -- Vehicle mileage use coefficient
d -- Load capacity use coefficient
e -- Productivity per average registered vehicle ton
f -- Ton
g -- t/km
h -- Cost per t/km, kopeks

Table 23

Primary Motor Vehicle Utilization Indices in Small Departmental Motor Pools Uzbek SSR for 1957

a Группы автохозяйств (количество машин)	b Коэффициент использования автопарка	c Коэффициент использования пробега автомашин	d Коэффициент использования грузоподъемности машин	Производительность на одну среднесписочную автотонну		h Себестоимость 1 т/км, коп.
				f т	g т км	
3—4	62,9	53,1	77,1	673,3	8873,8	7,1
5—9	62,1	48,4	79,3	589,4	8474,2	8,1
10—24	62,2	50,4	80,7	743,9	10146,4	7,8

Table 24

Uzbek SSR Sovnarkhoz Truck Use Indices for 1958*

a Наименование совнархозов	Коэффициент использования автопарка g	Коэффициент использования пробега h	Коэффициент использования грузоподъемности i	Производительность на 1 среднесписочную автотонну		Себестоимость перевозок 1 т/км, коп. m
				k т	l т/км	
b Ташкентский	65,6	52,3	87,8	2306,3	12716,5	8,2
c Ферганский	66,4	52,6	76,5	1329,4	12719,8	6,4
d Самаркандский	68,6	53,6	79,5	1021,6	12278,5	6,6
e Бухарский	62,0	54,6	69,4	708,1	9967,6	8,2
f Каракалпакский	60,0	49,8	72,7	529,2	7436,7	9,5

a -- Name of sovnarkhoz
b -- Tashkentskiy
c -- Fergan skiy
d -- Samarkandskiy
e -- Bukharskiy
f -- Karakalpakskiy
g -- Truck use coefficient
h -- Mileage use coefficient
i -- Load capacity use coefficient
j -- Output per average registered vehicle ton
k -- Ton
l -- T/km
m -- Trucking cost per t/km, kopek

*Figures of the Central Statistical Administration of the Uzbek SSR Council of Ministers.

possibility of organizing motor vehicle and truck trailer production in Uzbekistan.

Considering the requirements of the further development of industry, agriculture and transport in the republic, the USSR Council of Ministers in October 1956 adopted a decree on the organization of the production of truck trailers and motor vehicle spare parts here. A new plant, Tashavtomash, , was organized on the basis of Tashkhlopkomash No 1 Plant. In 1958 the Tashavtomash Plant began to produce new PAS-766 automatic dumping trailers for hauling raw cotton. Trailer production is very important to the republic's economy. In 1957 trailer hauls in the republic totalled 1,292,000 tons, and in 1958 -- 1,878,500 tons, 333,500 and 395,000 tons of which were handled by the Ministry of Motor Transport and Roads Uzbek SSR. A study of this problem shows that of ten truck trusts of the ministry, three -- Tashkent, Samarkand, Fergana -- hauled most of the tonnage. Other trusts, particularly the Khorezm, Karakalpak, Bukhara, Surkhandar'ya are making poor use of trailers. The use of trailers will make it possible to decrease hauling costs 20-30%, since it cuts down the cost per unit of transport operations. The job of truck transport workers is not only the observance of fuel consumption within the established standards, but also measures providing for a constant decrease in fuel consumption and lubricants, that is savings. Savings in fuel and lubricants is of economic importance not only as one of the means of decreasing the cost of motor vehicle transport, but also as savings in short supply materials. Even small savings in these materials on each vehicle, multiplied by thousands of vehicles, saves hundreds of tons of fuel in the economy. The road system should further an extensive use of trailers. If the condition of roads is good and the surface is not broken up, the use of trailers is possible even on unpaved but graded roads. Studies of the road system in the republic show that as a result of the rapid development of the productive forces of the economic regions of the Uzbek SSR it will be necessary to increase the network of good roads, particularly in the Amu-Dar'ya Basin, which will aid in cutting transport costs in the economy. The use of trailers, as stated above, is possible also on unpaved, graded roads. However trailers on these roads are used only in the summer, when there is no precipitation. Dirt roads, including graded, during atmospheric precipitation are subjected to "wet" damage effects, and in the summer -- "dry". This limits the use of trailers. Therefore, for the efficient use of trucking and trailers and a decrease in transport costs it is necessary to improve the condition of roads. Trucking in the republic increases from year to year, but repair and service facilities are

lagging behind the growth. This hinders an efficient utilization of trucking.

For many years the republic's vehicles were split up in small motor pools, which led to the development of small, poorly equipped auto repair shops in the garages of enterprises and offices. On 1 January 1958 they totalled more than 350. Small motor pools must handle even major repairs in these shops, which leads to excessive expenses and trucks stand around during repairs or waiting for them. For the efficient utilization of trucking, alongside an amalgamation of motor pool facilities, it is essential to expand motor vehicle repair industrial enterprises, which are dispersed among many ministries and departments. The fragmented nature of truck distribution and trucking enterprises makes it impossible to utilize the unit repair method, which requires the formation of a permanent working unit reserve; at small enterprises and motor pools such a fund cannot be formed. Auto repair industrial enterprises of the ministry and departments are located chiefly in Tashkent and Tashkentskaya Oblast which is really intolerable, since due to the lack of auto repair enterprises in all oblasts of the republic, trucks to receive major repairs must be hauled by rail 800-1200 km to Tashkent or Tashkentskaya Oblast. To satisfy the requirements of motor pools and repair enterprises for spare parts and standard specifications for trucks it is essential to specialize various plants or shops in motor vehicle repair plants in the production of these spare parts and standard specifications, freeing truck repair enterprises from producing them. The concentration of large industrial enterprises and schools in such large cities as Tashkent and Samarkand have determined in these cities a great population growth and development of mass public transit -- streetcar, trolleybus and bus, without which the existence of modern cities is unthinkable. Transit facilities in Tashkent, Samarkand, Andizhan, Fergana and other cities is of great socio-economic importance. The presence of any given type of transport influences the distribution in the city of enterprises, offices, residential sections, schools, parks, theaters, etc. The great population boom in Tashkent and Samarkand in the last 20 years is the main cause of the creation of a stable passenger flow, which made it advisable first to organize streetcar and then trolleybus service. Streetcar lines in Tashkent and Samarkand interconnect the various rayons of the city. In 1959 in Tashkent the total length of streetcar lines was 173.81 km, with 11 streetcar trains. During the Fifth Five Year Plan, Tashkent streetcar facilities were joined by new powered and trailer cars, designed more comfortably for their passengers. In August 1956 new and comfortable streetcars were delivered to Tashkent from the German democratic

republic. The cars are equipped with a supplementary source of power, which makes it possible to light the car in case of temporary power shutoff from a substation. During the Fourth Five Year Plan trolleybuses began service in Tashkent. Trolleybus lines, as streetcar lines, interconnect the outlying rayons and pass through the central streets of the city. By 1950 the number of trolleybus lines was increased to four. During the Fifth Five Year Plan new trolleybus lines were inaugurated and existing ones were extended. On 6 November 1954 the sixth trolleybus line went into service. In order to improve living conditions for workers and improve facilities in the city of Tashkent, the USSR Council of Ministers in 1958 decided to carry out in 1956-1960 a number of measures for the development of urban transit, including the layout of 20 km of new trolleybus lines. Enlargement of the city, chiefly through the construction of new multistory apartment and other buildings, the opening of new schools, building of plants and factories, constituted the primary factor for increasing the number and length of both trolleybus and streetcar lines. In 1955 more than 70 km of trolleybus lines ran along the central streets of Tashkent, while in January 1959 the number increased to 107.2. During the Fifth Five Year Plan and in subsequent years streetcar lines also extended further. In 1959 streetcar passenger transfers increased 10% and trolleybus transfers -- 130% in comparison with 1950.

The increase in the volume of passenger transfers by streetcar and trolleybus in the city of Tashkent is due to the rapid development of the city, extension of both streetcar and bus lines, the addition of new streetcars and trolleybuses. The somewhat decreased volume of streetcar passenger transfers is due to the rapid growth of bus service in Tashkent. In 1958 there were 34 bus lines in Tashkent and the total volume of passenger service was 100.5 million persons, while in 1959 the number of bus lines was increased to 43, and passenger service to 105 million.

During the Fifth Five Year Plan the river fleet was joined by new vessels. The freight-passenger fleet received the diesel-powered Przheval'skiy and Dzhambul, the self-propelled cargo fleet was joined by Navoy, Kutuzov, SB-1, SB-2, SB-4, SB-6, etc. These new vessels made it possible to handle the increased volume of cargo shipments. In 1955 569,000 tons of cargo was shipped into the Uzbek SSR and 661,000 tons shipped out. Increased freight shipments demanded the development of mechanization of loading and unloading operations and an improvement in shore facilities. Three-five ton truck cranes are now used for transferring freight from truck to ship and vice versa, NATI, DT-54 tractors and 4000 m loader cars for heavy freight. For dry cargoes, as well as cotton-

seed, type T-45 and T-46 transporters are used, 15 and 80 m in length respectively. In addition, Sharlauk Landing was built for improving freight operations, with a railroad spur line from Pitnyak Station on the Ashkhabad Railroad, the Kyzketken Canal Landing, and piers were rebuilt in Nukus, Chalysh, Chinaz and other points. Enlargement of the Central Asian State Steamship Lines Fleet and improvement in freight operations aided in handling the growing volume of freight. This volume increased by 36%. Particulary increases were shown by petroleum and lumber shipments, petroleum products, cotton, mineral fertilizers, etc. The chief cargoes along the Amu-Dar'ya are petroleum products for tractors and trucks, mineral fertilizers, cotton, farm machinery, grain, lumber, industrial goods and consumer goods. In order to provide safety for navigation on the river, during the Fourth and the beginning of the Fifth Five Year Plan navigation markers were set up on the Amu-Dar'ya at regular intervals, as on other rivers used for navigation in the Soviet Union. Since 1950 the Amu-Dar'ya has had navigation markers lit at night, which provides night navigation, in spite of the capricious nature of the channel and shallow places along the bars, and in 1952 electric and other automatic navigation signs were put up. This helped increase the volume of cargo operations. The Central Asian State Steamship Lines handled cargo shipments for the Uzbek, Turkmen, Tadzhik and Kazakh SSR. Cargo shipments on this river were also handled by Uzrechtrans of the Uzbek SSR Council of Ministers, which included the Nukus Operations section and the Kegeuli, Ravshan, and Kuvanysh-Dzharma canals, along which cargo is also shipped. Uzrechtrans handles the same cargoes as the Central Asian Steamship Lines. However, Uzrechtrans does not have a large fleet and cargo volume is not large. Uzrechtrans carried 8-9% of the total volume of the state steamship line service. Up to 1957 two transport organizations handled shipments on the Amu-Dar'ya and the Aral Sea: the Central Asian State Steamship lines and the Uzrechtrans (River Transport Administration of the Council of Ministers Uzbek SSR). Both had an administrative-operations set-up on parallel operations piers, one had ship repair yards and the other ship repair shops. The central Asian lines have a much larger fleet. Experience has dictated the advisability of not maintaining two transport organizations on one river. In 1955, for handling an increasing volume of cargo Uzrechtrans spent 100,000 rubles on building riverboats, while the Central Asian lines had a reserve of about 2,000 hp of tug fleet, 1500 t of dry cargo and 800 tons of tank or barge reserve. It is clear that the existence of both organizations also led to the inefficient expenditure of government funds. In January 1957 the fleet

and enterprises of Uzrechtrans were transferred to local Soviets. The industrial, construction, communal, irrigation development of the lower reaches of the Amu-Dar'ya caused a further increase in volume of cargo shipments along the Amu-Dar'ya and Sea of Aral. In 1958 the cargo volume for the Central Asian Lines increased 40% over 1956. Dry cargo shipments increased 29% in 1956-1958 and petroleum products -- 24%. In the period under study shipments of such cargoes as cotton, mineral building materials, clear petroleum products, wheat flour, etc., increased particularly. An increase in cotton shipments is due to the further development of cotton farming in the Amu-Dar'ya Basin, the production of mineral building materials is due to the great development of industrial, communal, irrigation and housing construction, and clear petroleum products are due to the mechanization of farming and irrigation jobs, as well as the development of motor vehicle transport. Consequently, the increase in cargo shipments was due to the continuous development of all branches of the economy. In seven years (1952-1958) cargo turnover on the central Asian lines increased by almost 250%. The increase in cargo volume required new vessels, and mechanization of loading and transshipment operations. An improved utilization of the existing fleet aided in handling the growing volume of freight. The addition of new vessels with shallower draughts made it possible to cut operational expenses (Table 25).

As can be seen from Table 25, during the period under study the fleet was joined exclusively by diesel-powered vessels with relatively shallower draughts. We should particularly mention the diesel Przheval'skiy, which can only be operated on the Sea of Aral. During this period the harbor and auxiliary fleet was also increased. The addition of new vessels made it possible to increase passenger service. In 1955 8600 persons were carried in transit service, 800 persons in local service, while in 1958 these figures were 26,700. The decrease in number of passengers in transit service is due to still-existing disadvantages. In 1950-1958 the self-propelled fleet was joined by 147 new vessels, and the tug-drawn fleet -- 121. 1952 was particularly a big year, and additions were made during the Sixth Five Year Plan. Due to the addition of new ships, obsolete vessels were removed from service. 159 vessels were removed from the self-propelled fleet and 135 from the tug-drawn, thus cutting down operational expenses, improving fleet utilization, etc.

Of great importance for the development of river transport was the building of canals. The canal imeni Lenin, the Chimbay Irrigation System and others are very important not only for irrigation but for freight transfer. Along such canals as the Kyzketken, Kegeyli, Kuvanysh-Dzharma, Ravshan,

Table 25

Specifications of Primary Vessels Built in 1952-1958*

Наименование судов	Тип судна	Мощность, л. с.	Грузоподъемность, т	Вместимость, рег. т	Род топлива	Осадка в порожнем сост., м	Осадка в груж. сост., м	Год постройки	Материал корпуса
o Грузопасс. флот									
p „Пржевальский"	M т/х	300	210	100	Кдиз. топл.	1,28	2,4	1952	l сталь
q „Джамбул"	т/х	130	30	36	"	0,53	0,735	1953	"
r Грузовой самоходный флот									
n Самоходная баржа-1	N с/б	80	60	—	"	0,29	0,767	1954	"
s „Алишер Навои"	т/х	100	50	—	"	0,53	0,735	1952	"
с/б-2	с/б	80	60	—	"	0,29	0,767	1955	"
с/б-4	с/б	80	60	—	"	0,29	0,767	1955	"
с/б-6	с/б	80	60	—	"	0,29	0,767	1955	"
t „Бируни"	т/х	160	70	—	"			1958	"
u Пассажирский флот									
v „Гайдар"	т/х	140	—	132	"			1957	"
w „Муса Джалиль"	т/х	140	—	132	"			1957	"
x „Фурманов"	т/х	140	—	132	"			1958	"
y „Божев"	т/х	140	—	132	"			1957	"

a -- Type of vessel
b -- Horsepower
c -- Cargo capacity, tons
d -- Passengers
e -- Type of fuel
f -- Draught
g -- Empty, m
h -- loaded, m
i -- Year of construction
j -- Hull
k -- Diesel fuel
l -- Steel
*Figures by Central Asian Steamship Lines.

m -- Diesel
n -- Self-propelled barge
O -- Cargo-passenger fleet
p -- Przheval'skiy
q -- Dzhambul
r -- Self-propelled merchant fleet
s -- Alisher Navoi
t -- Biruni
u -- Passenger fleet
v -- Gaydar
w -- Musa Dzhalil'
x -- Furmanov, y -- Bozhev

imeni Lenin and others, navigation is possible for 330 km. The irrigation canals Kyzketken, Kegeyli and Kuvanysh-Dzharma, constituting the Chimbay Irrigation System, for a long time were the only ones in Central Asia used for hauling cargo. The use of irrigation canals for freight service provides savings to the economy. Suffice it to say that the cost of goods shipments along the canals of the Karakalpak ASSR is less than one-half that of trucking. Cargo is hauled through the canals with wooden flat-bottomed 40-ton barges, pulled by the BMK-90 tug. The chief cargoes hauled through the canals are cotton, cottonseed, mineral fertilizers, farm machinery, etc. A breakdown of goods hauled through the Chimbay Irrigation System shows the tremendous importance of canals in the economy of the northeastern part of the right bank areas of the lower reaches of the Amu-Dar'ya, where there are no railroads. The canals of the Chimbay Irrigation System have an exit lock, without which it was impossible for vessels to go out of the canal into the Amu-Dar'ya. In this it differs from many irrigation systems in central Asia. The absence of exit locks up to 1957 in navigable canals (locks are planned and not built under the excuse of excessive irrigation construction costs), led to massive uneconomical hauls. The importance of the Amu-Dar'ya and the Sea of Aral in the economy of Uzbekistan, particularly the lower reaches of the Amu-Dar'ya, is tremendous, although navigation is of a closed nature and is carried out only within the limits of Central Asia. The closed nature of navigation does not decrease the importance of the river, since under conditions of a socialist planned economy all forms of transport make up a single transport system. One form of transport supplements the operations of another. The Amu-Dar'ya and the Sea of Aral on the one hand, and rail transport on the other, play a great role in organizing combined railroad-river freight service via Chardzhou and Aral'sk. Study shows that the primary transport-economic ties (interregional goods exchange) of the lower reaches of the Amu-Dar'ya are with the Urals, Kazakhstan, Siberia, and intraregional ties are chiefly with Tashkent, Fergana, Samarkand, Turkmen and Tadzhik economic regions. The importance of the Amu-Dar'ya in domestic economic ties after the beginning of operations of the Chardzhou-Kungrad Railroad did not lessen, and in interregional exchange it has remained important up to the present.

The lower reaches of the Amu-Dar'ya receive wheat and salt from Kazakhstan and the Altai, lumber from Siberia, industrial equipment from the Urals. Cotton fiber, cottonseed oil, wool, fruits and canned goods are shipped out. These goods form the interregional economic ties of the lower reaches of the Amu-Dar'ya and are shipped not only by railroad

but by combined rail-water traffic via Aral'sk. One of the basic items shipped from the lower reaches of the Amu-Dar'ya to the central sections of the country is cotton fiber. However, this commodity is still shipped in small quantities in combined service. The volume of cotton fiber shipments via Aral'sk in 1950 was 91,277 tons, in 1955 -- 120,513 tons, and in 1959 -- 110,200,000[7]. Calculations indicate that the shipment of cotton fiber by combined transport via Aral'sk will provide great savings to the economy by cutting down rolling stock required and lightening the load of part of the single track Kinel' Line.[8] The poor development of cotton fiber shipments via Aral'sk is due to the following: a) the lack of interest on the part of shippers in combined rail-water shipments due to the greater delay in delivery; b) damage to the bales of cotton during transfer operations, lowering its quanity; c) high cost of transfering cotton fiber (in Uchsay -- 1.26 rubles per ton, in Aral'sk -- 0.88 rubles. One of the basic factors considered by shippers in shipping cotton by mixed service are freight rates. The rate for shipping cotton is the regular rate plus 50% if the cargo is shipped only by railroad. The cost of shipping one ton of cotton from Biruni Landing to Uchsay, 415 km, is 7.57 rubles, while hauling it by railroad, considering the 50% increase, the cost is 2.346 X 1.5 = 3.52 rubles for the water section from Uchsay to Aral'sk, that is for 437 km the cost is 4.72 rubles, while by railroad it is 3.84. The rates for shipping cotton along the Ashkhabad Railroad are lower than water rates. This makes it more desirable for shippers to use just the railroads. Calculations prove that if cotton is shipped from Urgench Station to Rybnaya by railroad, the cost per ton of cargo is 20.89 rubles, while if it is shipped through combined transport via Aral'sk -- 22.40 rubles, and counting the cost of transfer -- 24.54 rubles. We should note that the organization of combined cotton shipments will make it possible to decrease the average haul distance. Freight cars of cotton from Urgench Station to Rybnaya Station make a run of 4615 km, while with combined service via Aral'sk -- 3108 km (counting 848 km by water). A decrease in ton-km operations per ton of cotton fiber will be 1507 t/km. The organization of combined shipments of cotton will provide savings in rolling stock. Calculations prove that with an average daily loading of four cars at Urgench station and a car turnover of 21.45 days, in purely rail transit for hauling the above indicated quantity of freight, 86 cars and 1.34 locomotives are needed. If this freight is hauled in combined service, only 58 cars and 1 locomotive will be needed. Water transport must play a decisive role in freeing railroads from excessive hauls. Cotton is hauled from the lower reaches of the Amu-Dar'ya to

the central-industrial region along the main lines Urgench-Chardzhou-Tashkent-Kuybyshev and overloads single track sections, particularly Arys'-Aral'sk. The development of combined shipments of cotton via Aral'sk will make it possible to cut the size of the flow of cotton along the above mentioned route. However, combined cotton shipments via Aral'sk have not been heavily developed, although they provide savings to the economy. First of all this is due to the fact that the cost of shipping goods as a whole and cotton as a particular along the Amu-Dar'ya and the Sea of Aral is comparatively high. According to figures by the Central Asian Steamship Lines, the actual cost of hauling one ton of cotton in 1958 was 3.3 kopeks -- almost 10 times as much as on the railroad. Consequently, the cost of hauling one ton of cotton from Urgench to Aral'sk -- a distance of 848 km -- would be 22.357 rubles,[9] and by railroad from Urgench Station to Rybnaya Station, a distance of 4615 km -- 10.66 rubles. One of the causes of the increase in operational expenses, in addition to the high cost of freight transfer, is the double transshipment of cotton in Uchsay and Aral'sk (2.14 rubles). In addition, shipment of cotton by rail-water transport involves additional expenses for packing materials and ships.

For shipping cotton on the Amu-Dar'ya and the Sea of Aral a certain number of ships are necessary. However, initial capital investment in mixed transport necessary for buying vessels is 20-25% less than for railroad transport alone. As a result of the high cost of shipping goods by water and the double transshipment, operational expenditures in mixed transport are 150% higher than with rail transport alone. This is seen from the fact that the cost of shipping one ton of cotton by rail along from Urgench station to Rybnaya Station is 10.66 rubles, while it is 27.5 rubles in mixed transport. For the development of mixed shipments of cotton through Aral'sk it would be advisable to build a universal vessel which could carry cotton from the lower reaches of the Amu-Dar'ya to Aral'sk without transshipping in Uchsay. This would make it possible not only to eliminate transfer operations in Uchsay, but would also cut down the shipping time. For this it is essential to improve the channels from the Amu-Dar'ya into the Sea of Aral. Since these bodies of water are still important in handling mixed rail-water shipments via Aral'sk in the future, the operations of such a vessel would greatly cut shipping costs along the lower Amu-Dar'ya. Due to the low speed of vessels, the time required to ship cargoes by river transport is considerably more than by truck or railroad. However, this disadvantage of river transport differs according to commodity. Certain commodities produced seasonally are consumed evenly throughout the year (grain,

cotton). Others on the contrary are produced the year around (mineral fertilizer), and are consumed seasonally. Such goods must be stored at the place of production or consumption. Slowness in shipment does not cause great losses to the economy. In order to eliminate completely this disadvantage of river transport in the lower reaches of the Amu-Dar'ya, it would be advisable during the winter to haul goods by railroad such as grain, forming reserves. In this case the commodities would be stored at the point of consumption. It is necessary to create grain reserves along the lower Amu-Dar'ya in quantities which would be equal or more than the volume of grain shipped (with delay) by the Sea of Aral. The slowness of vessels on the Amu-Dar'ya in comparison with other types of transport in shipping all categories is of importance for commodities the production and consumption of which is of a seasonal nature (mineral fertilizers, cotton, etc.). From the viewpoint of the general interests of the economy not only an accelerated shipping is important, but also regularity and continuity in shipments. Delayed shipments increase the volume of freight in transit, that is outside the sphere of production. This does not have great significance for goods produced and consumed seasonally, if reserves have been built up in the area of consumption during the winter. The importance of the Amu-Dar'ya and the Sea of Aral in handling intraregional economic ties of regions along the river basin is also great. Interregional economic ties of the Karakalpak ASSR, Khorezmskaya, Tashauzskaya, Chardzhouskaya, Maryyskaya and Surkhandar'inskaya, as well as Kzylordinskaya oblasts, effected by the river, aid in cutting shipping costs. In our opinion the cost of shipping goods along the Amu-Dar'ya must be compared with the cost of trucking and not railroad, since both river and truck transport in the Amu-Dar'ya basin handle interoblast, intraoblast and intrarayon shipments. The railroads ship goods on longer hauls. The cost of shipment is not high. In short hauls on the railroad the cost increases. The Amu-Dar'ya, intersecting the Karakalpak ASSR, Tashauskaya, Khorezmskaya, Chardzhouskaya and Surkhandar'inskaya oblasts is, as it were, a transport axis in the execution of inter-oblast economic ties. Between these oblasts lumber, petroleum products, cotton, fruits and vegetables, building materials and mineral fertilizers are shipped (Table 26).

In 1950 the volume of regional freight correspondence by waterways was 608,000 tons, and by 1958 -- 1,219,600 tons, that is the volume of transport-economic relations of the oblasts of the Amu-Dar'ya Basin had doubled. This not only characterizes the development of the productive forces of the region but also indicates a planned development of rail and water transport and the lack of competition between them.

Table 26

Regional Freight Correspondence Dynamics Along the Lower Amu-Dar'ya in 1958, t*

a Районы отправления	e Районы прибытия	i Всего	m В том числе								
			n хлеб. груз	o лесн. груз	p нефт. груз	q хлопок	r метизы	s мин. стр. мат.	t минеральн. удоб.	u цемент	v Прочие
b Хорезмская область	f Хорезмский	0,2	—	—	—	—	—	—	0,2	—	—
	g Кзылординский	4,3	—	—	—	4,3	—	—	—	—	—
	h КК АССР	94,6	0,2	0,6	63,7	—	0,02	—	29,3	0,1	0,2
	k Ташаузск. обл.	0,2	—	0,2	—	—	—	—	—	—	—
	i Итого:	99,2	0,2	0,8	63,7	4,3	0,02	—	29,5	0,1	0,2
c КК АССР	h КК АССР	200,7	6,5	14,1	3,8	6,2	46,5	47,1	1,1	0,7	64,2
	j Чардж. обл.	6,8	1,7	—	—	1,1	—	1,3	—	—	2,5
	b Хорезмская	13,6	13,1	0,[illegible]	0,03	—	—	—	—	—	0,3
	g Кзылординская область	127,7	5,1	1,1	—	101,4	0,07	—	—	—	8,0
	i Итого:	348,8	14,4	15,3	3,83	108,7	46,57	48,4	1,1	0,7	75,0
d Сурхандарьинская область	d Сурхандарьинск.	7,6	—	0,25	—	—	—	7,3	—	—	0,02
	l Тадж. ССР	110,2	0,1	2,9	42,7	0,2	12,0	0,6	—	27,0	8,1
	j Чардж. обл.	258,8	19,5	14,45	110,3	0,2	12,0	8,3	41,3	27,2	3,36

Legend on page 94.

The construction of the Chardzhou-Kungrad Railroad did not lead to a decrease in freight volume on the Amu-Dar'ya as a whole and freight shipments between the oblasts of the Amu-Dar'ya Basin in particular (Table 27). The total volume of goods transshipment of the port of Aral'sk is 200-250,000 tons, Uchsay -- 250,000 tons per year. Analysis of goods shipments on the Amu-Dar'ya and Sea of Aral pointed out that there are no large-scale inefficient shipment operations, with the exception of grain deliveries. However, due to the poor development of mixed rail-water shipments via Aral'sk at the present time inefficient economic relations exist between the lower Amu-Dar'ya and the Urals and Kazakhstan. It is obvious from Table 27 that during the period under study the economic intercourse between oblasts of the Amu-Dar'ya Basin grew from year to year. The development of economic ties is due to a growth in the productive forces of the oblasts of the Amu-Dar'ya Basin, chiefly in cotton raising and industrial construction. The major transshipment points on the Amu-Dar'ya and Sea of Aral'sk are Aral'sk, Uchsay, Farab, Termez and Takhiatash (Table 28). In 1958 37,500 tons of mineral fertilizers, about 8,000 tons of lumber and a small quantity of petroleum products were transferred from rail to sea for the lower Amu-Dar'ya. The lower Amu-Dar'ya is located relatively close to areas supplying mineral fertilizers, lumber, petroleum products, which are frequently hauled to the lower Amu-Dar'ya by a round-about rail route (Table 29).

The lower Amu-Dar'ya is one of the main consumers of these goods, a large part of which is hauled in exclusively by rail, although this is inefficient. Mineral fertilizers are shipped to the lower Amu-Dar'ya chiefly from the Urals, Aktyubinskaya and Moskovskaya oblasts. In 1959 the lower Amu-Dar'ya, as can be seen in Table 29, received by rail from the Urals 25,600 tons, from the center -- 11,500, from Kazakhstan (Orenburgskaya and Aktyubinskaya oblasts) -- 82,900 tons, and in combined rail-water shipments -- more than 40,000 tons. The geographical location of these regions -- the Urals, center and two other oblasts in Kazakhstan -- in respect to the lower Amu-Dar'ya called for the stepped-up development of combined rail-water shipments of goods via Aral'sk. In order to develop mixed rail-water shipments through Aral'sk it is necessary first of all to improve the fleet and rebuilt port facilities. The development of mixed shipments is important for the economy, since in the first place it eliminates long hauls, in the second place cuts down on the number of railroad cars and locomotives needed, and in the third decreases the time required for shipment.

It was particularly difficult to develop the upper Amu-Dar'ya from Termez to Pyandzh and from Termez to Khylkala.

Legend to Table 26:

a -- Origin of shipment
b -- Khorezmskaya Oblast
c -- Karakalpak ASSR
d -- Surkhandar'inskaya Oblast
e -- Destination
f -- Khorezm
g -- Kzylordinskiy
h -- Tashauskaya oblast
i -- Oolon
j -- Khardzhauskaya Oblast
k -- Kzylordinskaya Oblast
l -- Tadzhik SSR
m -- Including
n -- Grain
o -- Lumber
p -- Petroleum products
q -- Cotton
r -- Metal articles
s -- Mineral raw materials
t -- Mineral fertilizers
u -- Cement
v -- Other

*Figures by Central Asian Steamship Lines.

Table 27

Regional Freight Correspondence* Between Oblasts of the Amu-Dar'ya Basin in 1955-1958, 1000 t**

Наименование груза	1950	1955	1956	1957	1958
a Хлеб	179,7	210,4	137,4	133,3	157,5
b Лес	40,5	68,2	55,0	43,4	51,4
c Бензин	16,7	96,9	14,5	124,2	146,7
d Керосин	67,8				
e Мазут	34,0	47,7	54,2	57,5	56,1
f Смазочное масло	3,7				
g Хлопок	143,0	202,9	127,1	156,5	167,0
h Метизы и машины	28,2	15,0	113,6	128,6	198,0
i Мин. строит. материалы	6,0	17,0	55,5	89,5	102,2
j Мин. удобрения	65,5	75,1	99,4	106,2	100,0
k Хлопковое масло	18,5	20,0	17,0	св. нет	св. нет
l Цемент	2,5	19,0	20,0	11,2	29,0
m Промтовары	21,3	9,8	10,4	4,8	6,3
n Прочие	45,9	71,0	94,0	92,5	147,3
o Всего	772,2	893,0	850,0	1060,6	1219,8

a -- Grain; b -- Lumber, c -- Gasoline, d -- Kerosene, e -- Fuel oil, f -- Lubricants, g -- Cotton, h -- Metal articles and machinery, i -- Mineral building materials, j -- Mineral fertilizer, k -- Cottonseed oil, l -- Cement, m -- Industrial goods, n -- Other, o -- Total.

*Regional correspondence means economic intercourse between Surkhandar'inskaya, Khardzhouskaya, Khorezmskaya, Kzylordinskaya, Tashauskaya oblasts and the Karakalpak ASSR.

**The table has been drawn up according to figures by the Central Asian Lines.

Table 28

Transshipment of Goods at Major Ports and Landings in 1950-1957, 1000 t

Наименование грузов	g Аральск					
	b с моря на железную дорогу			c с железной дороги на море		
	1950	1955	1957	1950	1955	1957
d Хлеб	9,7	—	1,4	103,4	94,2	64,0
e Металлы не в деле и металлолом	—	1,6	2,0	0,7	0,04	0,3
f Минеральные удобрения	—	—	—	15,4	4,0	14,4
g Хлопок	91,8	120,5	94,7	—	—	—
h Лес	—	—	—	0,4	16,4	2,2
i Прочие грузы	4,3	5,5	0,7	14,5	6,6	2,2
j Соль	—	—	—	—	2,8	1,9
k Всего	105,3	129,4	98,9	155,9	124,2	87,0

Наименование грузов	l Учсай					
	m с моря на реку			n с реки на море		
	1950	1955	1957	1950	1955	1957
d Хлеб	101,5	94,2	64,0	9,3	3,1	2,2
e Металлы не в деле и металлолом	0,5	1,7	2,3	—	1,1	1,9
f Минеральные удобрения	31,0	4,0	14,3	—	—	—
g Хлопок	—	—	—	90,7	125,3	95,4
h Лес	0,4	20,6	8,2	—	—	—
i Прочие грузы	13,4	9,1	7,3	3,3	5,5	8,7
j Соль	0,8	9,1	7,6	—	—	—
k Всего	149,6	152,5	111,7	103,6	135,6	108,3

(Legend on page 96)

Legend to Table 28:

a -- Aral'sk
b -- From water to rail
c -- From rail to water
d -- Grain
e -- Metals not in finished form and scrap metal
f -- Mineral fertilizer
g -- Cotton
h -- Lumber
i -- Other commodities
j -- Salt
k -- Total
l -- Uchsay
m -- From sea to river
n -- From river to sea

Note: The high volume of goods shipments at ports in 1955 was due to the relative length of the navigation period in comparison with previous years.

Legend to Table 29:

a -- Destination
b -- Tashauzskaya Oblast
c -- Khorezmskaya Oblast
d -- Karakalpak ASSR
e -- Areas of origin
f -- Petroleum products
g -- Lumber
h -- Mineral fertilizers
i -- Gor'kovskaya Oblast
Permskaya Oblast
Moskovskaya Oblast
Chelyabinskaya Oblast
Orenburgskaya Oblast
Aktyubinskaya Oblast
Kemerovskaya Oblast
Stalinskaya Oblast
Altayskiy Kray
Krasnoyarskiy Kray
Irkutskaya Oblast
Buryat ASSR
Sverdlovskaya Oblast
Kuydyshevskaya Oblast
Saratovskaya Oblast
Bashkir ASSR
Armenian SSR
j -- Total

* The table has been drawn up according to figures by the mechanized registration factory of the Tashkent Railroad.

But the soviet rivermen were able to handle these difficult sections of the river. Via the river port of Termez the following goods are shipped to Afganistan: bulldozers, excavators, graders and other road-building equipment, lumber, fabrics, cement, etc., and in the other direction -- cotton, wool, dried fruits, raw hides, etc. We are speaking here chiefly of the Amu-Dar'ya. The Syr-Dar'ya, 2684 km in length, is navigable chiefly within Tashkentskaya Oblast. The Chinazskiy Operations section ships along the Syr-Dar'ya mineral fertilizers, machinery, farm products, kerosene, etc. Navigation could be developed more extensively along the Syr-Dar'ya if the dams of the Farkhadskaya and Kayrakkumskaya GES and the Kzylordinskaya Dam had locks for allowing ships to pass. Uzbek River transport during the Fifth Five year plan and subsequent years played an important part in economic development. In the period under study air transport was extended significantly. Up to 1956 IL-14, LI-2 and other piston planes were operated on Uzbek lines. During the Fifth Five Year Plan local aviation developed particularly into the Karakalpak ASSR, Bukharskaya and Samarkandskaya oblasts. This was due to the relatively poor development of roads connecting oblast with rayon seats, as well as the remoteness of many areas from the railroad, and in addition the rising standard of living had much to do with it. In degree of public use of air transport the Karakalpak ASSR occupies one of the leading positions in the republic. However, the development of air transport was insufficient for freeing motor vehicle transport from long passenger runs. In 1955 a new high-speed aircraft was developed -- the jet passenger plane TU-104 -- under the direction of chief designer, Hero of Socialist Labor, academician A. M. Tupolev. The cruising speed, that is the most economical, of the plane is 800 km/hr. Characteristic for this plane are arrowlike wings and completely streamlined tail assembly. The TU-104 ran for the first time between Moscow and Tashkent in October 1956. Since then regular air service has begun between Tashkent and our republic's capital. In June 1958 prop planes were removed from the Moscow run. The TU-104 began daily flights, subsequently changed to two and then three flights per day. In connection with operations of the TU-104, the Tashkent Air Fleet became radically changed. TU-104-A, TU-104-B and the TU-114 planes were produced. The TU-114 has four turboprop engines and is designed for 100 passengers. The development of Soviet aviation has made it possible to establish direct air communications between Moscow and the capitals of the foreign countries of the east via Tashkent. In August 1958 regular TU-104 flights began on the Moscow-Delhi route via Tashkent. The development of new aircaraft furthered a decrease in air rates. The Uzbek Civil Air Fleet Administration at the beginning of 1957

decreased rates an average of 30% for local passenger service, particularly along the following routes: Tashkent-Nukus, Tashkent-Samarkand, Tashkent-Bukhara, etc. The same year instead of the LI-2, faster and more comfortable IL-14's began to fly the Tashkent-Nukus and Tashkent-Mineral'nyye Vody runs. During the period under study planes began to be used more extensively in agriculture. For a long time the PO-2a plane was used, designed by Polikarpov. In 1954 a new and more productive plane appeared, the AN-2, designed by Antonov. The sprayer rate was increased to 21 kg of superphosphate per second. The use of the AN-2 makes it possible to increase greatly the volume of air fertilizing operations, stepping up the fight against field, orchard and vineyard pests. During a ten-hour workday a horse-drawn sprayer treats 14 ha, a tractor-drawn -- 36, the PO-2a plane -- 100, while the AN-2 sprays 250-270 ha. The extensive use of aircraft in agriculture involves additional expenses connected with the building of airfields, and in addition a plane cannot operate in small sections and sections which contain other objects; operations depend on weather conditions.

Soviet designers have created a new machine for agriculture -- the helicopter. In 1956 the first consignment of MI-4 helicopters arrived at the Uzbek capital. The use of helicopters in agriculture does not require the building of airfields or special landing strips. Helicopters can work all fields. The rotating horizontal propeller of the helicopter directs a strong flow of air toward the ground, which improves the penetration of the poison ejected from the tank of the helicopter into the plants. The stream of chemicals is flung downward with great force. Bouncing off the ground, it also sprays the bottom of the leaves. The MI-4s farming helicopter, designed by doctor of Technical Sciences M. Mil', is quite effective. The helicopter requires little space to land and take off. The capability of flying at speeds up to 200 km per hour, hanging motionless over one spot, rising and dropping along a vertical line opens up great possibilities for helicopters operating under the most unusual conditions -- in roadless and desert areas of the republic. Air transport during this period played an important part in improving the economy and culture of Soviet Uzbekistan. Due to the development of the productive forces of the republic, freight and passenger turnover in all types of transport increased greatly. Tremendous changes occurred in the structure of shipments: industrial goods took up more than one-half of the volume of goods shipped, and improvement in operations on the basis of incorporating the latest achievements of technology has boosted the development of all types of transport.

During the period under study the transport system was

expanded through the building of the new Chardzhou-Kungrad Railroad, a number of roads and gas lines. The extensive use of diesel locomotives in rail transport, large trucks, centralized shipments, as well as the amalgamation of small motor pools, the extension of the system of good roads, the use of large-capacity high-speed jets and turboprop planes, the addition of new vessels to the river fleet, maximum mechanization of loading an unloading operations, further improvement in freight shipment planning and other measures have made it possible to cut shipping costs in the economy.

CHAPTER SIX

THE RELATIONSHIP BETWEEN VARIOUS FORMS OF TRANSPORT IN THE REPUBLIC

As a result of the implementation of Party policies in Uzbekistan great success has been achieved in the development of transport. Truck and air transport, which did not exist before the revolution, appeared, and rail transport, furnished with modern equipment, constitutes one of the main elements of the country's single transport system. River transport was also developed extensively. To these four forms of transport one other has been added in recent years -- gas transfer, which has great prospects for the future in Uzbekistan. The presence in Uzbekistan of almost all forms of transportation and a large volume of freight and passenger transfer make it possible to effect an intelligent distribution of freight-passenger flow, that is establish a relationship between various forms of transport. The problem consists in developing each form of transport in correspondence to the sphere of its effective use. In this case the possibility is formed for transferring freight and passengers with the least possible expense, which will make it possible to decrease in the final analysis labor expenditures on production, circulation and shipment. In order to achieve the maximum development of each form of transport it is essential to solve a number of vital problems, the chief of which are the following: expansion of the hard-surface road system, construction of new railroads, development of new types of rolling stock and vehicles, for use by rail and truck transport, maximum mechanization of loading and unloading operations, the construction of mechanized loading facilities, development of a system of warehouses, organization of ferry service for freight across the Caspian Sea, all-out development of pipelines, reconstruction of airfields, achievement of rhythmic operations between the various forms of transport in hauling freight and passengers, etc. The distribution of freight and passengers between the various forms of transport in Uzbekistan depends definitely on the level of the development of transport facilities. In 1960 railroads totalled 14.8% of the total length of transport facilities in the Uzbek SSR, waterways -- 14.66, pipelines -- 1.06% and gas lines -- 5.83%. Due to the discovery of tremendous reserves of natural gas around Bukhara in recent years gas transfer has been developed. Before the discovery of Bukhara gas pipelines of local

significance were laid in the Fergana Valley. The total length of gas lines in the Fergana Valley by the end of 1957 was 71 km. Gas was used for filling the local needs of the valley. The construction of gas mains began in 1958. Between 1958 and 1960 the following lines were built: Dzharkak-Tashkent -- 625 km, Severnyy Sokh-Fergana -- 68 km, Andizhan village-Andizhan city -- 11 km. At present the density of the transport facility system per 100 square meters in Uzbekistan is as follows: railroads -- 0.56 km, oil pipelines -- 0.04 km and gas pipelines -- 0.22 km. Although railroads are second in length to roads, they handle a great volume of freight and passenger service (Table 30).

The ratio of rail transport in freight turnover in the republic began to drop slowly, and in passenger serviee it began to drop noticeably; the role of motor vehicle transport both in freight and passenger service increased, and the ratio of air transport increased in passenger service. The ratio of river transport and oil pipelines in the republic is low, The basic form of transport in the republic -- rail -- is the only means with the aid of which interregional and intraregional transport-economic ties are maintained throughout the year. The distribution of freight and passenger serviee between railroads and highways is of national economic importance, since many hard-surface roads run parallel to the railroads. These include Tashkent-Angren, the Fergana Belt Highway, the Zeravshan and Great Uzbek Highways. The distribution of freight shipments between trucking and river transport is, in our opinion, of little importance for the economy of the lower Amu-Dar'ya. Finally, the distribution of passenger service between air, rail and highway service is also a vital problem. As for petroleum pipelines for the transfer of crude oil, its advantages over rail transport cannot be disputed. For the efficient distribution of freight and passenger transfer between the various forms of transport, it is essential to proceed from their technical-economic features. In this we must consider the following economic indices: 1) capital investment, 2) operational outlay, 3) metal consumption, 4) labor consumption, 5) fuel consumption, 6) time spent in transporting freight and cost of freight in transit.[1] In addition, in our opinion it is essential to consider regularity in the operations of each form of transport. In distributing freight flow between various types of transport, under Uzbek conditions only rail transport can provide regularity, for even trucking in many regions does not operate regularly, particularly in the winter. It is also necessary to consider spoilage and damage to goods. All forms of transport are not equal in providing protection from damage and spoilage. Aircraft should be used for long hauls of highly perishable goods,

Table 30

Ratio of Various Forms of Transport in the Uzbek SSR in Freight and Passenger Service, %

a Вид транспорта	b Грузооборот			c Пассажирооборот		
	1958	1959	1960	1958	1959	1960
d Железнодорожный	90,1	89,8	89,2	37,8	34,6	32,7
e Автомобильный	8,1	8,3	8,9	37,2	38,8	41,1
f Речной*	1,2	1,2	1,2	—	—	—
g Трубопроводный	0,4	0,4	0,4	—	—	—
h Воздушный	0,2	0,3	0,3	7,1	9,6	10,7
i Трамвай и троллейбус	—	—	—	17,9	17,0	15,5

a -- Form of Transport
b -- Freight Turnover
c -- Passenger turnover
d -- Rail
e -- Motor vehicle
f -- River
g -- Pipeline
h -- Air
i -- Streetcar and trolleybus
*Passenger service by river-boat is quite small.

Table 31

Power Use Effectiveness in Various Types of Transport*

a Вид транспорта	b Общий вес поезда, *т*	c Отношение груза к общему весу	d Техническая скорость, *км/час*	e Мощность силовой установки, *л. с.*	f Работа, *т/км час* на 1 *л. с.*
g Грузовой автомобиль	6,0	0,50	50,0	90,0	1,6
h То же с одним прицепом	12,0	0,58	40,0	90,0	3,9
i Товарный железнодорожный поезд	3000,0	0,66	40,0	2800,0	28,0

a -- Type of transport
b -- Total train weight, tons
c -- Ratio of freight to total
d -- Technical speed, km/hr
e -- Horsepower and drive unit
f -- Work, t/km per hour per hp

(continued on page 105)

trucks for short hauls. At present, in view of the relatively poor development of refrigeration facilities not only in Uzbekistan but in the other Central Asian republics spoilage of goods, particularly on the railroads, is still too high, as a result of which the quality of perishable goods being transported drops sharply. This decreases the role of railroad in the distribution of perishable goods among the various types of transport.

We shall briefly give the significance of each index in determining the economic effectiveness of rail and truck transport. 1) capital investment. The cost per km of single-track rail line with diesel locomotives, rolling stock and freight turnover of 3,000,000 tons in the first year of service with i_p = 7%, totals 100 + 25 = 125,000 rubles. The cost per km of road with trucks according to figures by the Uzbek State institute of the Non-ferrous metals industry totals 70-100,000 rubles. The cost per km of railroad is 30 to 40% higher than the cost per km of non-blacktop road. In general the cost per km of single track railroad together with rolling stock is 1.5 to 3 times that of the cost per km of road. In this example for each ruble of capital investment in a single-track railroad there are 48 t/km of freight, and for trucking road -- 75 t/km. 2) Operational expenses.[2] Here it is necessary to consider not only expenditures depending on the size of traffic but expenditures independent of the train traffic, since it is not a matter of transferring freight for rail transport to trucks, but of determining the economic effectiveness of their use by building new roads. The average cost of rail freight shipments in the Uzbek SSR in 1960 was 0.37 kopeks, and for truck transport -- 7.2 kopeks per t/km, while for general use truck transport it was 6.2 kopeks per t/km, where trucks are larger and operations are better. The low cost of rail transport in comparison with trucking does not testify to the advisability of shipping freight by rail, since for short hauls the cost is even greater than for trucks. The level of rail shipment cost, and in general of all types of transport is greatly influenced by distance. Shipment of freight by railroad involves initial and terminal operations, without which the trains cannot be made up or disassembled. Expenses for the initial and terminal operations, since they are distributed proportionate to distance, in short runs noticeably influence the cost. At present the cost of initial and terminal operations per ton of freight is 0.5 rubles. This means that with a distance of 50 km 1 kopek is spent for each t/km, and with a distance of 15 km -- 3.33 kopeks, 10 km -- 5.0 kopeks and 5 km -- 10 kopeks. In comparing the cost of rail and truck shipments it is necessary to consider that the costs of maintaining roads are not counted in

the cost of trucking, while rail line maintenance costs are included in rail shipment costs. Expenditures for maintaining roads make up 15-16% of operational expenses.

Calculations of cost of rail and truck shipments are not made according to a single method; the existing method requires certain corrections. In rail transport operational expenses are determined by branches of the economy, and then the cost per t/km of freight shipments and passenger-kilometer of passenger transfer is determined, after which the cost per t/km is arrived at. In truck transport the cost is determined according to expenditures, dependent and independent of the amount of traffic. 3) Consumption of metal. The consumption of metal for building 1 km of single-track railroad line with rolling stock total 15 tons per million t/km per year. This is significantly greater than for any other type of transport. This means that rail transport is the most metal consuming type of transport. We should note that if the distribution of freight is made between operating types of transport -- rail and truck -- metal consumption in rail transport will be less, it is merely necessary to build the lacking number of cars for handling the freight flow transfered from trucking. 4) Labor expenditure. In distributing freight flow between rail and truck transport labor expenditure is very important, since the shipment of goods with the least labor expenditures greatly decreases the cost of shipment.

Freight is shipped by rail with less labor expenditure than for trucking. This is due to the fact that the cargo capacity of railroad cars is much more than that of trucks, railroad lines ship 15-20 million tons of freight per year, roads much less. A train consisting of 30 4-axle cars with a 3,000 hp locomotive is operated by a crew of five, while in truck transport for the shipment of the same quantity of freight 375 ZIL-150 trucks are required with an equal number of drivers and loaders. In rail transport more drive force is expended to move freight than in trucking (Table 31). In trucking an average of 15 hp is required for each ton of freight, and on the railroad -- 0.9 hp. It follows from the above that in rail transport less labor is expended in transferring goods than in trucking. Labor productivity in Uzbek Railroad transport total 600,400 t/km, in general use truck transport 65,900 t/km, and even less for truck transport in the republic as a whole. The method of calculating labor productivity in truck transport requires more accuracy. In rail transport, in determining labor productivity, the workers of all sections are included in the operations group, which more correctly reflects the level of labor productivity, while in truck transport road repair crews are not included in the operations group. This deliberately upgrades labor

Legend to Table 31 cont.:
g -- Truck
h -- Truck with trailer
i -- Freight train
*A. S. Kudryavtsev, Ekonomika Sotsialisticheskogo Transporta, (Economic Social Transport), Textbook, Avtotransizdat, Moscow, 1957, page 43.

Table 32

Ratio of Various Forms of Transport in the Uzbek SSR in 1959-1965, % of Total Shipping*

a Вид транспорта	1959	1960	1965
b Грузооборот, всего	100,0	100,0	100,0
c в том числе			
d железнодорожный	89,8	89,2	86,3
e речной	1,2	1,2	1,2
f Автомобильный	8,3	8,9	11,2
g Трубопроводный	0,4	0,4	0,5
h Воздушный	0,3	0,3	0,8
i Пассажирооборот—всего	100,0	100,0	100,0
c в том числе			
d железнодорожный	34,6	32,7	19,5
f автомобильный	38,8	41,1	49,8
h воздушный	9,6	10,7	18,5
j трамвай	11,9	10,7	6,8
k троллейбус	5,1	4,8	5,4

a -- Type of Transport
b -- Total freight turnover
c -- Including
d -- Rail
e -- River
f -- Truck
g -- Pipelines
h -- Air
i -- Total passenger turnover
j -- Streetcar
k -- Trolleybus
*From the Seven Year Plan for the Development of the Uzbek SSR Economy for 1959-1965.

productivity, while in fact this index would be even less if the road repair crews were included. In order to increase labor productivity in truck tranport it is necessary first of all to improve vehicle utilization. Calculation shows that if the degree of truck load capacity utilization were increased by 1%, an additional 1,377,000 tons of freight could be hauled. In order to increase labor productivity all-out development of centralization of shipments must be achieved, as we have discussed the advantages of this in the preceeding section. The use of trailers also influences greatly an increase in labor productivity. However, at present a small amount of freight is hauled by trailer. In 1960 only 1.6 million tons of freight were hauled by trailer. The level of labor productivity in truck transport is influenced by the use of large trucks and an expansion of the hard surface road network. On hard surface roads not only operational expenses are less, but trailers and longer rigs can and should be used. 5) Fuel consumption. Fuel consumption is important for determining the economic effectiveness of rail and truck transport. There is no common denominator for determining fuel consumption in rail and truck transport. In rail transport fuel consumption is determined per 10,000 t/km gross, and in truck transport gasoline consumption is determined per 1000 km of mileage, depending on the make of truck. In 1960 fuel consumption on the Tashkent Railroad per 10,000 t/km gross with diesel locomotives totalled 45.8 kg and 1.08 rubles, while in general use Uzbek truck transport the figure for 1000 km was 380 liters or 41.04 rubles.[3]

The amount of fuel consumption is influenced greatly by movement resistance in rail and truck transport. Resistence in truck transport is much greater than in rail. At a truck rate of 40-50 km/hr on improved roads resistance is 12-15 kg per t, and on rail transport at the same speed -- 2.3. Such a great difference is due to the fact that the weight of loaded freight cars is 11 times that of ZIL-150 trucks. 6) The time required for transporting goods and the cost of freight in transit. The time for transporting goods is extremely important in the country's economy. Time gained by accelerating goods shipment not only speeds up the turnover of working capital but also will increase labor productivity. At the present time the rate of shipping goods on the Tashkent Railroad is 10 km/hr, and in general use truck transport -- 16-17 km/hr. Truck transport has a clear advantage over rail. Freight shipments by rail for short distances not only increase the time required for delivery, but cars are used extremely inefficiently and the time spent by the freight car under way is 2-3% of total car turnover. An acceleration of the time required to ship goods by rail by

increasing the weight of trains, improved utilization of rolling stock and the extensive use of diesel locomotives will make it possible to handle shipments with less rolling stock and fewer workers. Tt follows from the above that rail transport has a number of advantages over trucking. The continuity, mass nature and relatively low cost, high labor productivity, comparatively less fuel consumption and other advantages make rail transport the primary form in the republic. Experience has proved that truck transport should play a decisive part in short hauls. But in the republic in many outlying regions trucks haul freight long distances, and here trucking is justified, since in these areas freight flow is not large and for the time being there is no need to build railroads. The sphere of truck use is being expanded more and more. This is aided by the extensive use of large-capacity dump trucks, the extension of the road system and use of trailers. The Seven Year Plan calls for a great change in the relationship between various types of transport. This is due to the fact that all short rail hauls now taking place will be transferred to trucks. As a result of expanding the hard surface road system the ratio of truck transport in intraoblast and interoblast shipping will increase (Table 32.)

It is clear from Table 32 that the ratio of rail transport during the Seven Year Plan in freight turnover and particularly passenger turnover will decrease. A decrease in the ratio of rail transport in freight turnover occurs through a great development in trucking. A significant change will take place in passenger turnover. A drop in the ratio of rail transport in passenger service is due to the addition of large-capacity jet and turboprop planes to the Civil Air Fleet, as well as the extensive development of bus service. During the period of stepped-up Communist construction the saving of time is of first-rate importance, since the bringing of economic regions in our country closer together in time will accelerate the rate of building the material-technical basis of communism in the USSR. In addition, a steady rise in the standard of living and regular decrease in air rates will further an increase in the ratio of air transport in passenger service. During the beginning of Seven Year Plan the sphere of streetcar use will be greatly limited, due to the development of more comfortable forms of urban transit -- buses and trolleybuses. The planned and proportional development of all types of transport will make it possible to distribute efficiently the flow of freight and passengers among the various forms of transport, establishing an intelligent relationship among them.

CHAPTER SEVEN

BASIC TRENDS IN TRANSPORT DEVELOPMENT

Extensive interregional and intraregional transport-economic links within the republic can be effected only if transport develops together with the development of economic regions. Extensive specialization and cooperation of industrial enterprises are possible only through rail transport, using the most modern equipment and well-developed rail system. Particularly great is the role of rail transport during the period of stepped-up communist construction. In 1959 the Soviet nation entered a period of stepped-up communist construction. The 21st Party Congress outlined the ways of developing the national economy for 1959-1965. The creation of a material-technical basis for communism means the further extensive development of heavy industry, which is the basic foundation of the socialist economy -- ferrous and non-ferrous metallurgy, power engineering, the chemical, petroleum, gas and machine building industry. Technical progress, automation and mechanization of production processes, the extensive use of atomic energy, chemicals and gas in the national economy are essential elements in creating the material-technical basis for communism. During a period of a sharp increase in freight shipments and passenger service efficient transport operations become extremely important. The intelligent selection of direction in the development of transport will make it possible to satisfy to a maximum the requirements of the primary economic law of socialism, that is transport will fully aid in the rapid development of productive forces and the creation of a material-technical basis for communism in this country. The correct selection of the basic direction for the development of transport will make it possible to carry freight and passengers with the least transport costs, filling the requirements of the economy to a maximum for freight and passenger service, deepening the socialist division of labor, specialization and cooperation between industrial branches. Distribution of freight and passenger service between various types of transport, taking into consideration their technical-economic features, the presence of a single transport system, service by all types of stransport and their development according to a single economic plan, the possibility of organization and total development of combined rail-water shipments and many other advantages of socialist

transport over capitalist make it possible to determine the basic trend in the development of transport.

Under Uzbek conditions the development of cotton farming, the gas, chemical, oil refining, machine building industry, ferrous metallurgy, building materials industry, and the constant rise in the standard of living on the one hand, and the continually developing transport-economic links between this republic and other areas of the country on the other, constitute factors determining the basic trends in the development of Uzbek transport. In 1965 cotton production in the republic will total 3.8 million tons. This means that trucks will haul 6.4 millions tons of raw cotton[1], rail and river transport facilities -- 1.3 million tons of cotton fibre, 12,000 tons of down, 354,000 tons of cottonseed oil; truck and rail transport -- 1.9 million tons of cottonseed, 850,000 tons of oilcake, 560,000 tons of husks, 83,000 tons of soap. Total cotton product shipments in all types of transport will be 10,860,000 tons. This requires the solution of a number of present transport problems.

In the estimated figures for the development of the USSR economy for 1959-1965 great attention is devoted to the development of all types of transport, particularly rail. In 1959-1965 a radical technical reconstruction of rail transport is called for, that is, a transfer of main lines to electric and diesel locomotives, the laying of sturdier and heavier rails, equipping many lines with automatic block systems, central dispatcher systems, the extensive utilization of radio communications, television. In addition, new railroads are to be built. Thus the radical technical reconstruction on the basis of technical progress constitutes one of the basic trends in the development of transport. Technical progress is the fundamental basis in the development of transport, the deciding factor in handling rapidly increasing freight shipments, increasing labor productivity, labor efficiency and increasing the country's labor resources. The influence of technical progress on labor productivity in the area of rail transport is seen in two ways: on the one hand new equipment results in labor savings where it is introduced, and frees workers for other jobs. On the other hand, new equipment improves equipment utilization standards and thus increases labor productivity. Technical progress under capitalism also increases labor productivity, but this intensifies labor, while under socialism labor productivity is increased through an intensification of equipment use[2].

The main element in technical progress in rail transport under our republic's conditions is the extensive application of diesel locomotives not only on main lines but

in switching operations. The diesel locomotive is more economical and powerful in comparison with the steam locomotive. In utilizing diesel power the weight per train increases greatly, which aids in increasing labor productivity, since we experience an increase in output per worker. An increase in train weight takes place not only through the extensive application of diesel locomotives and large-capacity six-axle cars with a capacity of 93-100 tons, but also through a great increase in industrial shipment, the ratio of which will go up to 75-80% in the future in rail transport freight operations. An increase in labor productivity through an increase in train weight is involved with the lengthening of arrival and departure sidings at stations. At the present time a further increase in the weight of trains in many cases is limited by the length of station sidings. The present length of many arrival-departure sidings is insufficient for heavy-weight trains, as a result of which in certain sections the capacity of diesel locomotives is being utilized inefficiently.

For a further increase in train weight, decrease in transport costs in the economy, creation of reserves of traffic capacity on the railroad sections and savings in capital investment necessary for increasing the traffic capacity of railroad lines, as calculations show, the useful length of arrival-departure sidings on main lines should be no less than 1100 m. This length will make it possible to increase the weight per train, allowing heavy and long trains to pass at way stations. The extensive utilization of diesel locomotives will make it possible to increase the average locomotive run, which also will increase labor productivity of transport workers. In 1958 the average daily diesel locomotive mileage was 403 km. In the future this will increase to 600 km, by 1965. The average daily locomotive mileage will increase through total change on the Tashkent main line to diesel locomotives, double-tracking and sturdier and heavier rails, as well as automatic block systems on the lines. This will also make it possible to extend single locomotive runs. Up to 1958 on the Tashkent main line there were nine steam locomotive and two diesel depots. Locomotives were operated on short runs from 75-120 km. Short runs on the Tashkent road were necessary, for servicing steam locomotives every 70-80 km. The implementation of the TE-3 diesel on existing runs hindered a more efficient utilization of diesels, which did not require frequent servicing. Under present conditions, each brigade would have time off at the changepoints. For the efficient utilization of rolling stock, the locomotive runs were extended in the second half of 1958. For example, the Tashkent-Syrdar'inskaya run (80 km) was extended to Ursat'yev-

skaya station (151 km), Leninabad-Gorchakovo (180 km) was extended to Ursat'yevskaya station (260 km)[3], etc. An extension of the locomotive runs made it possible to eliminate several steam depots (Syrdar'inskoye, Leninabad, Denau, etc). Extension of the locomotive runs required a changeover to the shift system, whereby the brigades do not remain with their diesels. In this method of diesel servicing each one will be responsible for all locomotives, and all will be responsible for each. Here a genuinely communist attitude is shown to community property. The lengthening of the runs made it possible to increase the average daily diesel locomotive mileage in 1959 to 540-580 km. For more efficient diesel locomotive utilization it is essential to lengthen further the single locomotive runs. Diesel operations in the Seven Year Plan on main runs such as Chen'gel'dy-Ursat'yevskaya (460 km), Ursat'yevskaya-Kagan (905 km), Kagan-Termez (992 km) etc, will not only make it possible to increase the average daily diesel mileage, but also that of cars, increas- labor productivity, accelerate turnover and cut down the requirements of the road for rolling stock. In the total shift of the Tashkent main line to diesel drive units the sequence of shifting to diesel traction of the various units is of much importance. We must proceed not only from an increase in average daily mileage for locomotives and cars but also from a decrease in operations costs.

Diesels should be used extensively not only for main line hauling, but also for switching operations. It is true that the cost of a series TE-1 diesel is almost twice that of the series E steam locomotive. The diesel will make it possible to cut operations costs in switching operations and handle more cars per day. This means that without supplementary capital investment the handling capacity of a station will increase. The diesel will make it possible to save in capital investment necessary for increasing the stations's capacity. With the use of diesels, since the switching operations process will be more rapid, the time spent for each switching run will be less, which is important for cutting down the time spent by cars at freight yard stations. Operating cars on the average spend more than 40% of their time in operation at section and sorting yards. Cutting this time by the extensive use of diesels in switching operations leads to an acceleration in freight car turnover and in the final analysis, to a decrease in the requirements of rail transport for cars. One of the basic elements of technical progress is the laying of sturdier and heavier rails, which make it possible for heavy trains to run at higher speeds. These R-50 and R-65 rails will make it possible to cut down running track maintenance costs.

Heavy rails, layed on rock ballast and ferroconcrete ties, will not only cut down operations costs but will improve rail operations. Ferroconcrete ties are the thing for the future. They last 40-50 years (the effective life of impregnated wooden ties is 7-8 years). In our opinion in the near future we should lay ferroconcrete ties on all lines in Tashkentskaya Oblast, and in succeeding years, in Samarkandskaya Oblast and the Fergana Valley. There are railroad sections in the republic where mechanization of transport processes is extremely important. These are loading and unloading, as well as track operations. It is true that in these operations a good part of the work is mechanized, but the loading and unloading of much freight is handled manually. The manual method not only increases the cost of transport operations but increases the time spent by cars idle, worsens their use indices. In 1958 in the freight yards and on industrial spur tracks of the Tashkent main line 48% of all loading and unloading operations were mechanized.

The June Plenum of the CC of the Party (1959) devoted serious attention to the mechanism of freight operations in transport. In the efficient use of freight cars, mechanization of loading operations is very important, which will make it possible to cut down the time spent by cars during loading and unloading, will accelerate their turnover and decrease the requirements of the road for cars, cut down capital investment volume necessary for building railroad cars. The cost of building a car averages 3,500 rubles. Calculations indicate that due to total mechanization of cotton fibre loading the Uzbek SSR would save more than 500,000 rubles per year. However, a large percentage of loading and unloading operations in the republic are still done manually. A further development of total mechanization of loading and unloading operations on spur tracks leading to industrial enterprises and freight yards, where up to the present about one half of all freight operations are handled manually, will make it possible to save on production costs. If we consider that the cost of handling one ton of freight manually in 1958 was 26.7 kopeks and 11.8 with machinery, with total mechanization we will save more than 1.6 million rubles per year. In the future we should devote more attention toward carrying out measures which will make it possible to raise universally the level of loading and unloading operations mechanization, primarily on industrial spur tracks, which handle a considerable (70-80) percentage of the total volume of rail freight operations.

The addition of jib, diesel and motor cranes mounted on railroad cars in 1959-1965, with hoist capacities of 5-50 tons, electric gantry cranes with a span of 11.3-16 m

and hoist capacity of 5-10 tons, 3-10 ton loader trucks of various models with fork lift devices for operating in open areas, as well as small 1.5 ton loaders, sufficiently maneuverable for operating in warehouses and inside box cars, will enable maximum mechanization of loading and unloading operations in rail transport. In view of a further increase in crated and piece shipments it is essential to extend the package method of shipping these goods on pallets. With this the use of the small fork lift is advisable. The time spent by freight cars during loading operations with pallets in comparison with operations without the use of pallets is cut 40-60%. This makes it possible to accelerate freight car turnover, decrease the cost of handling freight and increase labor productivity in loading operations. In the final analysis success in total loading operations mechanization will depend on the extensive use of containers. In view of increased shipments of farm products and building materials, of particular importance is shipment in special containers of vegetables, fruits, as well as slate, glass and other commodities, where particular regulations must be observed in shipping and transfers. It is intolerable that up to the present, as a result of carelessness, about 20% of all potatoes, 10% of glass, 15% of bricks, etc., are ruined in transit. The use of containers will not only provide total mechanization of loading and unloading operations, but it will make it possible to cut expenses on packaging materials. The following example is interesting. Expenses for packaging one ton of glass for shipping in freight cars total 13.5 rubles, in containers -- 2.45 rubles. Containers are also important for making the shipment of small commodities efficient. If small commodities are carried in containers, they are shipped on flatcars, the capacity of which is used to a greater extent than that of boxcars in hauling small commodities. Several million rubles are saved in packaging. Many containers and boxes are shipped by truck to the rayon seats of the oblasts in this republic. The transfer of 2.5 ton capacity boxes by truck along poor roads is extremely difficult. It is quite possible to haul lighter containers by truck on poor roads. The Seven Year Plan provides for the production of containers with smaller capacity -- 0.5 and 1.25 tons. This will advance the crating of goods. Crating should be combined with the construction of new crate storage areas not only at large but also at small stations, to which oblast roads adjoin. By bringing crate storage areas to industrial and farming centers it will be possible to cut transport costs greatly. The rapid development of industry, farming, construction and commerce in Tashkent has led to a great increase in freight handling at Tashkent

Freight Station. Business between the station and all shippers and consignees in the city of Tashkent, the presence of numerous spur approach tracks and five container storage areas require the construction of a mechanized freight loading yard which would provide maximum mechanization of loading operations. Mechanized yards would make it possible to cut down greatly the time spent by freight cars in loading and unloading, decrease the needs of rail transport for cars, accelerate the process of forming and dissassembling trains and decrease the cost of freight handling. Samarkand, Kokand, Andizhan and other stations also need a mechanized freight handling yard. One of the elements of technical progress in rail transport is the equipping of sections with automatic block systems, which will not only increase traffic safety but will increase the traffic capacity of lines by 30%. One of the most laborious jobs in rail transport are track reapairs. Track repair brigades must be given mobile power stations with sets of machinery and tools for tamping ties, cutting rails and other jobs formerly done manually.

For more effective traffic direction the train dispatcher must have radio contact with train engineers, which would make it possible for the duty dispatcher to know what section the train is on, the train's speed, and the dispatcher could tell the engineer that the train was transiting through way stations and indicate the track, at what station the meeting would take place, give weather forecasts, etc. This is important for increasing traffic safety and the traffic capacity of railroad sections. It is true that radio communications are used on a small section of the Tashkent main line. We must provide radio communications with the rail sections Kagan-Samarkand, Samarkand, Ursat'yevskaya, Ursat'yevskaya-Andizhan and Kzyltukumachi-Angren. An inseperable element in technical progress in rail transport is the installation of centralized electric switch operations at the main railroad stations. A significant increase in the number of passenger and commuter trains, as well as maximum train safety required electric switch centralization at Tashkent passenger station, which freed a great number of switchmen. With electric switch centralization all incorrect operations are impossible, which provides complete traffic safety. The great increase in rail freight turnover makes it necessary to equip major stations such as the Tashkent Freight, Ursat'yevskaya, Kagan and Kokand with electric switch centralization in the near future. The application of the objective law of planned and proportionate development of society to transport requires not only the extensive incorporation of the latest equipment, but also new rail and road construction, gas mains and the total develop-

ment of all types of transport. The socialist planned economy contains all opportunities for the harmonious development of all branches of the economy, including rail transport. Proportionate development of rail transport requires the harmonious and total development of links in the rail system, in order for one branch not to slow the development of an other. In order to increase train weight it is essential to produce a more powerful locomotive, sturdier roadbed, heavier rails, as well as an increase in the number of ties per km of track, the installation of automatic block systems, etc. Radical technical reconstruction should be combined with the building of new railroads. Many existing lines are overloaded, which cuts down their flexibility. Many railroad lines in the republic are single-tracked, and with the significant increase in the amount of train traffic, the section speed will decrease.

At present Uzbekistan has 2324 km of lines as compared to 1300 in 1913. The density of the system in the Uzbek SSR is 0.56 km per 100 sq km of territory, and 2.8 km per 10,000 population, while in the USSR as a whole the density is 0.6 and 6.0 respectively. In density the USSR as a whole and Uzbekistan in particular still lag behind a number of capitalist countries. In Great Britain the density of the rail system[4] is 14.3 and 6.6 respectively, in the USA 4.5 and 21.5, in West Germany -- 15.0 and 7.3. However, although the density of the system is not an all-encompassing index, it without a doubt reflects the level of rail transport development. New rail construction requires major expenditures of labor and materials. The periods required for capital investment in rail construction to pay for itself are greater than those in the reconstruction of rail transport. Low density indices per unit of territory in Uzbekistan are due to the fact that the roads are built chiefly in more densely populated regions. Such areas ias the Karakalpak ASSR, with an area of 167,900 sq km, has a total of 100 km of rail lines, Bukharskaya Oblast, with 122,000 sq km -- 276 km, etc. Existing Uzbek main lines Kagan-Ursat'yevskaya, Ursat'yevskaya-Andizhan and Ursat'yevskaya-Tashkent, Arys'-Orenburg were built 60-70 years ago, when freight was hauled in small volume, where the level of development of productive forces of the area was low, many regions were not populated, the lower reaches of the Amu-Dar'ya, the Southwest of Uzbekistan, the Turkmen and Tadzhik SSR did not experience great transport difficulties in their ties with the European part of the nation due to the roundabout nature of the then existing rail routes to the center of the USSR. During the years of Soviet authority the productive forces of Central Asia developed rapidly, and goods shipments increased sharply, inter-

regional transport-economic ties increasing greatly between Central Asia and the European and Eastern areas of the country. The existing rail route from Central Asia to Europe remained the only one. Along this route goods flowed from formerly sparsely populated regions to the European part of the USSR, from which these regions received industrial goods. The configuration of the rail route was unacceptable for many regions in Central Asia. Due to lack of a short rail route across the lower Amu-Dar'ya to Europe, the entire area of the Amu-Dar'ya basin, Southwest Uzbekistan, the Turkmen and the Tadzhik SSR bear heavy transport expenses in maintaining economic ties with Europe. The present level of the development of productive forces in Central Asia requires the development of new rail construction both on routes from Uzbekistan to Europe, to the Eastern areas of the country, as well as within the Central Asian republics themselves. New rail construction is extremely important from an economic standpoint. The building of rail lines will produce great savings to the economy. Main line railroad construction under Uzbek conditions will make it possible to cut down the distance of hauls, that is, decrease ton-km operations. Calculations indicate that due to the construction of the Kungrad-Aleksandrov Gay road the route from Europe to Central Asia will be cut by 755 km. New rail construction will make it possible to cut down the number of locomotives and freight cars, train and locomotive brigades, etc. A decrease in the number of cars and locomotives means that those units not needed will be used on other lines, where a shortage is felt, and in this manner we will save in capital investment necessary for building new cars and locomotives. This will aid the rapid development of productive forces, increasing rail productivity.

The effectiveness of new rail construction consists also in the fact that due to a decrease in the distance of hauls time required for shipment will also be decreased, as well as the volume of freight in transit. This means that freight will leave the sphere of transfer more rapidly and the development of production will be accelerated.[5]

This is quite important in the peaceful competition between two systems and the creation of a material-technical basis for communism. The development of new rail transport under Uzbek conditions will lighten the load of all rail routes. For example, the construction of the Kungrad-Aleksandrov Gay line will lighten traffic on the single-track Kinel' route, and will save on capital investment necessary for developing this route, creating reserves of traffic capacity, improving flexibility in operations, etc. The effectiveness of new rail construction is not limited by this.

The construction of a railroad in Uzbekistan will give a sharp boost forward to the development of productive forces in regions lying along the railroad and will raise the standard of living. One can estimate the importance of new railroad construction for the development of production on the following example. Cotton farming along the lower reaches of the Amu-Dar'ya, which until 1953 was cut off from the rail system, is the main branch of farming in the area, but could not develop intensively. Before the building of the railroad the goods necessary for developing cotton farming could not be delivered, and the shipping of cotton was quite difficult, the cotton sometimes being flown out. Cotton fiber production in Khorezmskaya Oblast and the KK ASSR in 1950 was 84,700 tons. The Chardzhou-Kungrad railroad greatly improved commercial intercourse between this area and others. By 1955 cotton production on the lower Amu-Dar'ya totalled 134,600 tons, and in 1960 -- 155,000. In addition to cotton farming, industry and various branches of agriculture have developed on the lower Amu-Dar'ya. However, an increase in production in this region was achieved not only due to the construction of a new railroad, but also through extensive capital investment in industry and agriculture. Another important element in new rail construction is an upswing in the national republics, as well as a rise in the standard of living, the creation of skilled workers and technical cadres. The construction of the Salar-Barrazh, Kzyltukumachi-Angren railroads played a tremendous part in creating the Chirchik and Angren industrial regions. The development of the Angren coal beds alone greatly cut the import of coal to the republic from Karaganda and the Kuzbass. As a result of the development of the Angren industrial region ferrous metallurgy of all-union significance was developed in the republic. The development of the Chirchik and Angren industrial regions played a great part in improving interregional transport-economic ties. The substantial cut in the importation of mineral fertilizers, farm implements, china, coal, mineral building materials and other goods from distant economic regions made it possible to cut transport costs. New rail construction in the Uzbek SSR will also affect the economy through speeding up passenger service. In creating a material-technical basis for communism, alongside technical progress, the efficient utilization of time by members of society is of first-rate importance. Analysis of the development of the productive forces of the oblasts in the republic has indicated that due to the insufficient development of rail transport many oblasts have a relatively low level of production development. For example, the lower Amu-Dar'ya was cut off from the rail system for a long

time. Althoughin 1953 the Chardzhou-Urgench section of the Chardzhou-Kungrad line went into service, the right bank of the Amu-Dar'ya, which contains tremendous reserves of inert materials, has no railroad. Existing quarries along the right bank of the river are not being worked due to the absence of a railroad, although the lower reaches of the river need large amounts of road building materials. In order to surface roads, stone is brought from Bukhara to Khorezmskaya Oblast, and from Mara to Tashauzskaya. It is hauled 700-800 km by rail; the quality of the stone is poor. As calculations have shown, 2,800,000 cu m of quarry stone will be needed merely for surfacing primary roads, including blacktop, along the lower Amu-Dar'ya. It would be advisable to use the high quality stone of Dzhumurtau, which is distinguished by great strength. At present stone for civil and irrigation construction is hauled by truck from Dzhumurtau. Its cost according to calculations operative in Khorezmskaya Oblast is 12.0-16.0 rubles per cu m. In working the Dzhumurtau quarry manually, the cost of stone necessary for road surfacing will be about 40 million rubles. The construction of roads with rock surface requires great expenditures. In order to avoid inefficient expenditures we should mechanize the operations at the Dzhumurtau quarry. According to calculations by the Khorezm Road Administration, with mechanized operations in Dzhumurtau and rail transport of 100 km, its cost would decrease to 3.0-5.0 rubles per cu m. This would make it possible to cut down the amount of allocations required for rock surfacing roads. Calculations show that initial capital investment in building a mechanized plant in Dzhumurtau would be paid for rapidly. For the efficient utilization of the tremendous reserves of stone in Dzhumurtau it is advisable in the near future to build a line from Dzhumurtau to Tashauz station, 40 km long.

In order to haul stone from Dzhumurtau it would be advisable to set up belt routes between Dzhumurtau and Tashauz. A unit formed of 15 four-axle flatcars, the train weighing 1300 tons gross, furnished with a TE-1 locomotive and crew, would deliver stone to Tashauz. From here the materials would continue to the south and north of the lower reaches of the Amu-Dar'ya. After being unloaded, the train unit would go to Dzhumurtau station, where a locomotive would be coupled to the train, already loaded with stone. The organization of belt routes will make it possible to cut down greatly the time spent idle by cars in loading operations and accelerate the rolling stock turnover. The Chardzhou-Kungrad railroad runs along the left bank of the Amu-Dar'ya, intersecting all of Khorezmskaya Oblast, and in the KK ASSR it extends for about 100 km. The

primary industrial and farming regions of the KK ASSR lie along the right bank, which is connected with the left bank by ferry. Of nine administrative rayons in the KK ASSR five are on the right bank, including Nukus -- the capital of the ASSR. Primary economic links between the ASSR and the administrative and industrial regions of Central Asia are maintained by rail. Goods shipped by rail to the right bank rayons of the ASSR must be ferried across. At the beginning of winter and spring, when the ice is not very thick, it is extremely difficult to transfer goods across the ice, and sometimes traffic stops altogether. The right bank section of the KK ASSR needs normal transport links with the left, which has railroad lines. In order to improve transport-economic ties between the right and left bank it is necessary to build a pedestrian bridge during the Seven Year Plan near Takhiatash, making it sturdy enough to support motor vehicle traffic. The area of Sultan-Uiz-Dag ridge contains large reserves of minerals and building materials. The utilization of quarry products from Sultan-Uiz-Dag ridge would speed up reconstruction of the road system not only along the lower Amu-Dar'ya but also in Tashauzskaya Oblast. The shipping of building materials by truck and river is extremely expensive and involves great operational expenses. Therefore it is essential to build a Nukus-Chimbay-Sultan-Uiz-Dag rail line in 1965-1970 from Sultan-Uiz-Dag, to haul out minerals and building materials.

Studies conducted by the Economics Institute of the AS UzSSR for the development of the productive forces of the Southwest region of the UzSSR indicated that due to the lack of a railroad linking Samarkanskaya Oblast with Surkhandar-'inskaya by the shortest route, not only these oblasts but the Tadzhik republic (excluding Leninabadskaya Oblast) bear extensive transport costs in view of the roundabout nature of the existing line. The interests of developing the productive forces of this region demand the construction of a new railroad line between Samarkand and Karshi by the shortest route. Transport-economic ties in the Southwest of Uzbekistan will expand greatly in the future due to the farming of the Karshi steppe and the development of farming in the Zeravshan Basin, and the necessity will arise not only for double-tracking the Kagan-Ursat'yevskaya section but also for building a straight route between Karshi and Samarkand. Farming the Karshi steppe is possible if the necessary goods are hauled regularly by rail and delivered by truck to the area of consumption. The straight route Samarkand-Karshi will not only speed up the farming of the Karshi steppe but will aid in developing productive forces. This line, 290 km long, will make it possible to cut freight mileage

by 240 km. Samarkand-Karshi will be a freight route.

The rapid growth of industrial forces in the Fergana Valley will also heighten the question of rail construction. In the future the interregional and intraregional economic ties of the Fergana Valley will increase greatly due to the development of cotton farming, petroleum, chemical and light industry as well as other branches of the economy. Calculations indicate that the existing single-track line Ursat'yevskaya-Kokand-Andizhan in the future will not be able to handle the traffic, even if automatic block systems are set up and the TE-3 diesel is used. The problem of developing new rail construction can be solved in two ways: the construction of a new direct line Pridonovo-Akhangaran with the simultaneous double-tracking of the sections Kzyltukumachi-Akhangaran- Angren and Pridonovo-Kokand-Andizhan, or the construction of new roads through hethe Central Fergana on the Andizhan-Kokand-Pridonovo and Pridonovo-Akhangaran route with double-tracking on the Kzyltukumachi-Angren section. The latter variant is more expensive, but it will speed up the exploitation of the Central Fergana and will cut trucking costs for hauling goods to and from railroad stations. The necessity of building new railroads in this region proceeds also from the shift of the metallurgical plant in Begolvata to a full cycle. According to preliminary calculations by candidate of Economics Yu. O. Alferov, the freight turnover of the plant will be several million tons in the future.

Total use of raw materials from the Angren mining region brings up the necessity of building a number of interrelating industrial installations, the production activities of which require the total development of rail, road and cable railway transport, the building of a number of industrial spur tracks. A preliminary study of this problem indicates the necessity of changing the Kzyltukumachi-Angren rail section to electricity, double-tracking, the installation of automatic block systems, etc. The total development of transport for the Angren mining region will further an efficient organization of freight hauling processes between industrial installations with the least possible transport costs. The development of rail transport in Uzbekistan is influenced greatly by a growth in the economies of the Turkmen, Tadzhik and Kirgiz SSR, since goods from these republics are transit shipped through our republic. A growth in the economy of Central Asian republics, an increase in interrepublic shipment volume, as well as an expansion in transport-economic ties of the Southwest of the republic, lower reaches of the Amu-Dar'ya, the Turkmen and Tadzhik SSR with other economic regions in the country located outside of Central Asia will in the future increase the

rail traffic on the single-track Kagan-Ursat'yevskaya line an average of 60%. Such an increase is due primarily to the fact that in the Southwest of the Uzbek SSR the major cotton region will develop, with the development of the petroleum, chemical, and cement industries and other branches of the economy. all of this requires the laying of a second track on the Kagan-Ursat'yevskaya section and the equipping of this section with automatic block system in the near future. The building of new railroads between outlying oblasts in the republic, such as Karshi-Samarkand, Akhangaran-Pridonovo, will lead to a redistribution in switching operations for a number of junction stations such as Tashkent-freight, Ursat'yevskaya, Kagan, etc. For example, due to the building of the Karshi-Samarkand railroad on a direct route, Kagan station will not be so heavily loaded. However, the sorting of cars heading for Surkhandar'inskaya Oblast and the Tadzhik Republic (excluding Leninabadskaya Oblast) will be handled at Samarkand station, which requires new track construction. therefore in determining the economic effectiveness of capital investment in new railroad construction we must consider expenses for station siding developments and switching facilities for a number of sorting stations. The problem of the development of new railroad construction on routes from central Asia should be solved in our opinion, proceeding from the commercial intercourse of Central Asia. Measures directed toward handling increased volume of freight and passenger service, due to the increase in interregional relations between the economic regions proceed primarily from the freight traffic along the railroad lines. A constant increase in freight traffic makes it essential to equip railroads with new facilities. Let us assume that on a one-track line, where traffic is controlled by semaphores, as traffic increases such measures are taken as a strengthening of the tracks, utilization of more powerful locomotives, transition to improved methods of rail traffic -- semi-automatic, automatic, etc. If traffic reaches such a level whereby all measures for handling it are exhausted, the most expensive variant is applied for handling the increased volume of shipping -- laying a second track. This is what happened on the Tashkent-Kaufmanskaya section, later on the Tashkent-Arys' and Kaufmanskaya-Ursat'yevskaya, etc. Such measures are quite intelligent, since the railroad line runs from east to west and intersects to one degree or another economic regions. Economic regions which do not require direct lines are served by this line. The configuration of the existing railroad system in the republic corresponds to the inconsistent displacement of economic

administrative rayons. Certain economic regions in the republic are located relatively close to the European section, Kazakhstan, the Urals, Siberia, but they are not interconnected by a direct route rail line. An increase in rail freight turnover is determined by interregional economic ties. Therefore it is necessary to establish the large economic regions in the country with which Uzbekistan and the lower Amu-Dar'ya, the southwest region, the Turkmen and Tadzhik SSR in particular should have primary interregional ties.

The lower Amu-Dar'ya and the Zeravshan basin on the one hand are pporly served by railroad, but these regions have a great potential for the development of productive forces. On the other hand we should consider the ever-expanding interregional economic ties with the East. The basic cause for increase in freight traffic on the Kagan-Ursat'yevskaya line is the constant increase in commodity exchange between the Southwest, the lower Amu-Dar'ya, the Turkmen and Tadzhik SSR and the European section of the country, the Urals, Kazakhstan and Siberia, as well as their links with Tashkent and Fergana economic regions. In order to determine the trends in primary interregional goods exchange in Uzbekistan we studied importation in 1957-1959 of 65 categories of goods (Table 33).

Uzbekistan has primary interregional commercial intercourse in importation of goods from the Urals, Kazakhstan and Siberia. We should note that our republic is also a large consumer of farm machinery, tractors, motor vehicles, metal products, the ratio of which is 4.5% in interregional goods exchange. Interregional exchange in the goods indicated takes place to a great degree with the European part of the USSR (Table 34).

It is evident from Table 34 that in 1959 the ratio of the European part of the USSR in Uzbekistan imports of motor vehicles, tractors, farm machinery and metal items was 52.19%, the Trans-Caucasus Republics -- 0.86%, the Urals -- 24.86%, Kazakhstan and Siberia -- 22.09%. In view of the extensive development of construction for the creation of the USSR's third metallurgical base, further development of machine building and other branches of heavy industry in the eastern regions, Uzbekistan's interregional commerce in the above-mentioned goods in the future will be carried out to a great extent with the eastern regions. This is due to the fact that the eastern regions are relatively more closely located to Central Asia and the cost per ton of pig iron at the new mills of the third metallurgical base of the USSR will be 16.9 rubles, while at the present Novolipetsk plant it is 21.3 rubles and at Krivoy Rog (second unit) -- 23.7

Table 33*

Ratio of Large USSR Economic Regions in Interregional Goods Exchange for Uzbek Imports 1957-1959

a Экономические районы**	1957	1958	1959
b Центральный	5,45	4,11	5,35
c Северо-Западный	1,82	0,89	0,97
d Поволжский	2,98	3,54	4,05
e Северо-Кавказский	0,62	1,04	1,4
f Уральский	18,8	15,69	16,02
g Западно-Сибирский	11,7	9,01	9,77
h Восточно-Сибирский	22,54	21,44	21,8
i Дальневосточный	0,3	0,36	0,4
j Донецко-Приднепровский, Юго-Западный и Южный УССР	3,8	3,99	5,4
k Западный	0,25	0,27	0,25
l Закавказский	0,9	0,82	0,9
m Казахстанский	31,1	38,6	38,3
n Белорусская ССР	0,24	0,22	0,3
o Молдавская ССР	0,09	0,02	0,09

Legend: a --Economic regions b --Central c --Northwest d --Volga e --North Caucasus f --Urals g --Western Siberia h --Eastern Siberia i --Far East j --Donets-Dniepr, Southwest and Southern Ukraine k --Western l --Trans-Caucasus m --Kazakhstan, n --Belorussian SSR o---Moldavian SSR

*The table has been formulated according to figures by the mechanized registration Factory of the Tashkent Railroad.

**According to the decree by the CC of the Party and Council of Ministers USSR of 26 April 1961 for No. 381 17 large economic regions were set up in the USSR and two economic administrative regions

Table 34*

Interregional Goods Exchanged with Various USSR Regions in 1957-1958, %

Экономические районы	1957	1958	1959
Центральный	20,37	20,8	20,46
Северо-Западный	2,26	2,8	3,95
Поволжский	7,5	8,4	9,99
Северо-Кавказский	2,4	2,5	2,49
Уральский	22,83	25,4	24,86
Западно-Сибирский	13,06	10,5	10,04
Восточно-Сибирский	1,44	1,05	1,2
Дальневосточный	0,64	0,7	0,57
Донецко-Приднепровский Юго-Западный и Южный УССР	9,3	10,3	12,54
Западный	0,56	0,6	0,70
Закавказский	1,92	1,3	0,86
Казахстанский	13,4	11,9	10,28
Белорусская ССР	2,32	1,78	2,03
Молдавская ССР	—	0,02	0,03

Legend -- See Table 33.
*The table has been drawn up according to figures by The Mechanized Registration Factory of the Tashkent Railroad.

rubles[6]. We have studied Uzbekistan's interregional transport-economic ties with the large economic regions of the USSR in goods export (Table 35).

As can be seen from Table 35, in 1959 the ratio of the European part of the USSR for goods from the Uzbek SSR totaled 38.13%, the Urals -- 9.18%, the Trans-Caucasus -- 2.5%, Western and Eastern Siberia and the Far East -- 10.79% and Kazakhstan -- 39.4%. Consequently, Uzbekistan in goods shipped out has established basic interregional economic ties with Western and Eastern Siberia and Kazakhstan, as well as with the Urals. Here we should note that the primary commercial relations of the Uzbek SSR for outgoing goods are with the European part of the country and the Eastern regions of the USSR, shifting them primarily after the war. Prospects for the future development of the country's productive forces indicate that industry and agriculture in Kazakhstan and Siberia will develop more rapidly than the Western regions of the country. Tremendous natural resources -- timber, coal, non-ferrous and rare metals, iron, gold, polymetals, oil, land, etc., on the one hand, labor resources and the use of the best modern technology on the other hand, will create favorable conditions for the further development of the productive forces of the eastern regions. In addition, the East, particularly the Kazakh SSR and the Altai Kray, in the future will be as before major grain regions, which is important for furnishing grain to the Uzbek SSR. In the planned figures for the development of the USSR national economy for 1959-1965 it is outlined that more than 40% of USSR capital investment will be directed toward developing the productive forces of the eastern areas. During the Seven Year Plan in the eastern regions, chiefly in Siberia, lumber operations will expand, which is also important for furnishing the Uzbek SSR with sawed lumber. Years of study conducted by the Academy of Sciences Uzbek SSR on the development of the lower Amu-Dar'ya and the southwest region of the republic[7] has indicated that these regions possess rich natural resources, particularly the Southwest, for the further development of productive forces. The future construction of the Amu-Bukhara, Amu-Karakul and Kelif canals, reservoirs and other irrigation projects will aid in farming and irrigating the Karshi Steppe and the Zeravshan basin. A rise in the productivity of cotton and expansion of farm land will make it possible to increase cotton production in the Southwest of the Republic up to 1.7 million tons in the future. Cotton farming is the basis of the Uzbek SSR economy, and around it other branches of industry and agriculture will develop. In the future the Southwest region of the Uzbek SSR will become a major cotton-growing area in Central

Table 35

Ratio of USSR Economic Regions in Goods Exported from Uzbekistan in % to Total Annual*

Экономические районы	1957 г.	1958 г.	1959 г.
Центральный	16,3	15,58	16,3
Северо-Западный	3,16	2,88	2,98
Поволжский	2,3	2,04	2,27
Северо-Кавказский	2,6	0,7	0,74
Уральский	11,7	8,5	9,18
Западно-Сибирский	4,1	5,23	5,15
Восточно-Сибирский	4,1	8,8	4,44
Дальневосточный	0,91	0,88	1,2
УССР	7,9	3,74	3,24
Западный	4,3	6,27	7,4
Закавказский	5,1	0,77	2,5
Казахстанский	34,2	40,4	39,4
Белорусская ССР	2,8	4,06	4,5
Молдавская ССР	0,53	0,15	0,7

Legend -- See Table 33.
*See Table 33 and 34.

Asia -- in the Zeravshan basin and the Karshi Steppe. The cotton center will include also orchards, vineyards, silk, poultry farming, livestock for slaughter, dairy products, which constitute a basis for the rapid development of light industry, the food, cotton cleaning, wool, leather-footwear industries. The discovery of natural gas near Bukhara made it possible for the Southwest of Uzbekistan to occupy a leading position in the fuel balance not only of the Republic but of the USSR. Bukhara natural gas is a valuable raw material for developing the chemical industry, which will develop in the Amu-Dar'ya basin. The construction during the Seven Year Plan of a nitrogen fertilizer and cement plant in Navoi, a /melanzhevyy/ combine in Bukhara, the Naroi GRES and numerous other enterprises testifies to the fact that the Southwest region of the Republic has a great future.

Analysis of interregional economic ties not only of the Southwest Region of the Republic but the Western areas of Central Asia showed that the primary economic ties of these regions in the future will be with Kazakhstan, Western and Eastern Siberia, the Urals and, to a lesser extent, with the central part of the country, the Northwest and the rest of the areas in the European part of the country. Lumber, grain, products of various branches of heavy industry, livestock products, wool fabrics, wood chemistry products and products of the woodworking industry will be shipped from the eastern regions, from the Urals -- machine equipment, motor vehicles, while the ratio of these goods in interregional economic ties will be more that 60-65%. The European part (excepting the Urals) will handle 40-35%. As local light industry develops the ratio of the central area will drop. It is true that the European section will be the number one supplier of machine tools, motor vehicles, products of electrical power engineering, industry and other types of machine building products, the production of which requires highly skilled and fine labor. Efficiency of interregional economic ties for the Uzbek SSR in the future requires the juncture of Bukharaskaya Oblast with Kzylorda by railroad, and further on with Dzhezkazgan. This will make it possible to eliminate existing roundabout hauls, decrease the distance (by 700 km) and rolling stock. In the final analysis transport costs in the economy will be cut. In addition, the Kagan-Ursat'yevskaya-Arys'-Kzyl-Orda rail route will be lightened in traffic and capital investment necessary for increasing the traffic capacity of this route will be decreased. The absence of steep grades, and the gentle slope along this line joining the Amu-Dar'ya basin with Kzylordinskaya Oblast will make it possible not only to decrease

shipping costs in comparison with the Kazakh Railroad but also , utilizing the TE-2 diesel locomotive, to haul heavier trains than on the Kazakh Railroad. The length of this line from Bukharskaya Oblast to Kzyl-Orda is 650 km, from Kzyl-Orda to Dzhezkazgan -- 600 km. Consequently, the building of the new railroad from Bukharskaya Oblast to Kzyl-Orda will make it possible to eliminate roundabout hauls, saving in capital investment necessary for increasing the traffic capacity of individual rail sections. The building of a railroad from Bukharskaya Oblast to Kzyl-Orda and on to Dzhezkazgan does not yet fully solve the problem of developing new rail construction on the routes from Central Asia to other economic regions in the USSR. The existing rail route from Central Asia to Europe (Kinel' route) increases the length of hauls from the Turkmen, Tadzhik SSR, the lower Amu-Dar'ya, the Southwest Region of Uzbekistan and Samarkandskaya Oblast, since the economic relations of these regions are maintained by roundabout routes, as a result of which these regions bear heavy shipping costs.

The lower Amu-Dar'ya, southwest of Uzbekistan in comparison with Tashkent and Fergana regions have been little studied. Nevertheless a study of the lower Amu-Dar'ya and the southwest of the Republic, carried out by the Council for Studying Productive Forces and the Institute of Economics AS Uzbek SSR indicates that these regions contain large amounts of natural resources, and much unfarmed land. In the future industry and agriculture will be greatly developed in the Amu-Dar'ya basin. The lack of a short, direct rail route from the lower Amu-Dar'ya to Europe constitutes one of the causes for the relatively poor development of productive forces in these regions. For the creation of conditions for the development of productive forces in the western part of Central Asia and the lower Amu-Dar'ya, and efficiency in interregional commercial intercourse, it will be necessary to join Kungrad with Aleksandrov Gay via Makat. The construction of this railroad will be extremely important in view of the discovery of extensive oil deposits on the Ust-Urt Plateau. Linking Central Asia by rail through the lower Amu-Dar'ya with Europe is not a new matter. Many studies were devoted to this problem. As early as the seventies of the nineteenth century the problem arose of building a railroad straight through from Europe to India, and part of this road was to run along the lower Amu-Dar'ya through Aleksandrov Gay-Kungrad-Chardzhou. After building the Trans-Caspian Railroad and bringing the railroad as far as Tashkent the question came up several times of linking Turkestan with the country's railroad system. In 1905 Orenburg was joined with Tashkent. The lower Amu-Dar'ya

remained cut off from the country's railroad system. But in 1912 the question was once again raised of the necessity of linking the lower Amu-Dar'ya with Europe across Chardzhou-Kungrad-Aleksandrov Gay for lightening traffic on the Orenburg-Tashkent line. In 1913 a plan was drawn up for an Aleksandrov Gay-Chardzhou main line. After the beginning of the Revolution construction of this line was placed as critical in 1919. This was due to the temporary occupation of Baku by the British imperialists. In 1928-1929 economic investigation was made once again of the entire plan. In 1930 work began on the line from Chardzhou, but it was stopped after 30 km. In 1933 the Institute of Economic Studies of the Central Asian Gosplan organized a brigade which worked on the problem of transport links with the Khorezm oasis.[8] This brigade did a fine job and came to the conclusion that it was necessary to join the lower Amu-Dar'ya with the European part of the USSR. However, this road was not built during the pre-war Five Year Plans for a number of reasons. During the Fifth Five Year Plan the Chardzhou-Kungrad section was built as a main line.[9]

The XIXth Party Congress which took place in 1952 devoted much attention to the development of rail transport and included the Kungrad-Makat-Aleksandrov Gay line in the railroad construction plan. The problem of linking by rail the lower Amu-Dar'ya with the European part of the country was discussed also in the journal Zheleznodorozhnyy transport (Rail Transport). In an article by Dmitriyev, Khanukov and Khokhlov, "The Main Turkmen Canal and Problems of Rail Links in Central Asia",[10] the necessity and advisability of building a railroad along the Kungrad-Makat-Aleksandrov Gay route was also indicated. Finally, at the July Plenum of the CC of the Party in 1960, which discussed the fulfillment of resolutions of the 21st Party Congress on the development of industry, transport and the incorporation into production of the latest achievements of science and technology, the necessity of building the Aleksandrov Gay-Kungrad main line was emphasized.[11]

This problem was discussed in the local press in a number of articles by the author of this work. The total length of the Kungrad-Makat-Aleksandrov Gay line is 1100 km. The easy terrain on this route will not only facilitate rail construction but will make it possible to eliminate dual locomotives and rear-coupled locomotives. This route will require only slightly more than half the locomotive power in comparison with the Kinel' route, where there are more "harmful" grades, and this is important for railroad operations. In order to determine the freight turnover of this line we proceeded from the prospects of interregional economic ties between the regions of Central Asia with the

European part of the country, and we set up the following areas Chardzhou-Kungrad-Makat-Kandagach-Arys'-Tashkent-Chardzhou and Chardzhou-Kungrad-Makat-Aleksandrov Gay-Urbakh-Iletsk-Arys'-Ursat'yevskaya-Chardzhou. In determining the freight turnover of this line we considered that due to the new line the shortest route is opening up for the western regions of the areas, along which it is advisable to maintain interregional economic intercourse with the industrial Urals and the North Caucasus and other economic regions of the European part of the USSR. Calculations indicated that the freight divide is at Dzhizak Station. Freight turnover on this line is formed of interregional transport-economic ties between the regions located in the western part of the areas, the Amu-Dar'ya basin, the Southwest of the Republic as well as the Turkmen and Tadzhik SSR.[12]

Before determining the future freight turnover on this line, we calculated the dimensions of interregional economic ties with the European part of the country at present. Goods which could be shipped to Central Asia from Europe if this railroad were in operation are ferrous metals, steel and cast iron pipe, lumber, cement, mineral fertilizers, potatoes, motor vehicles, tractors, farm machinery, fabrics, lubricants, clothing, underwear, knitwear, machine equipment and other goods. A study of this problem showed that the present extent of interregional ties between the western regions of Central Asia and the European part of the country in goods imports requires the building of a Kungrad-Aleksandrov Gay railroad. Without a doubt economic ties between these regions and Europe for goods export would be handled via Makat. Calculations have shown that the total volume of imports by the western regions of Central Asia from the European part of the country by rail in 1959 were 3.2 million tons, and exports total 2.4 million. Consequently, total imports and exports were 5.6 million tons. We determined the total future import and export of the Makat route. In order to determine import and export for Central Asia on the Makat route, we determined the total gross production of industry and agriculture along the lower Amu-Dar'ya, the Southwest Region of the Republic, the Fergana valley, the Turkmen and Tadzhik SSR for the future. In addition, we determined the Central Asian import and export structure. Along the Makat route cotton fiber, vegetable oil, fresh and dried fruits, textile machinery, cotton down, cement, non-ferrous metals, wine, oil-cake, canned vegetables, products of the chemical industry, karakul, textile machinery, excavators, fabrics and other goods will be shipped out of Central Asia. Central Asia will receive from Europe machine building products, industrial goods,

metals, motorcycles, phosphorous fertilizers, textile goods, tractors, footwear, clothing, underwear, knitwear, furniture, rails, machinery equipment and other goods. According to our calculations, total imports and exports through Makat in the future will be 10 million tons, including six million tons import and four million tons export. Worthy of attention are calculations by Mosgiprotrans for determining freight flow along the Kungrad-Makat-Aleksandrov Gay Line. Although the total volume of imports and exports determined by Mosgiprotrans for the Makat Route does not cause great fear, the structure of both export and import requires additional work in our opinion. For example, they determined future lumber imports to central Asia at 1.1 million tons. In our opinion this is too high. They were correct in including lumber under imports, but the problem lies in which regions should supply lumber for central Asia. A study of the problem of lumber supply for Central Asia indicates that before the construction of the Turksib Railroad lumber was shipped to Central Asia only from the European part of the USSR. After this road was put into operation lumber began to come to Central Asia from Siberia, which contains tremendous timber reservee. The role of Europe in supplying Central Asia with lumber decreases due to the inefficient nature of shipping lumber from Arkhangel'skaya and Vologodskaya oblasts and the Komi ASSR, as well as from other northern regions of the country to Central Asia. At present lumber is shipped chiefly from Siberia to Central Asia (Table 36).

It is obvious from Table 36 that the import of lumber (cut and rough) to Central Asia has increased 18% in three years. According to the figures in the Table we can easily determine the ratio of the western and eastern regions in lumber for Central Asia. In 1957 the western regions shipped 436,740 tons, in 1959 192,010 tons, the eastern regions -- 2,833,700 tons and 3,667,400 tons respectively. In the period under study the ratio of the western regions in lumber to Central Asia decreased by 127%, while the ratio of the eastern regions increased by almost 30%. This is quite logical, since western and particularly Eastern Siberia possess tremendous timber reserves and due to their geographical position are aptly suited for shipping lumber to Central Asia. The construction of the Kungrad-Makat-Aleksandrov Gay Railroad will make it possible to cut the length of lumber hauls from the western regions to Central Asia. Lumber is shipped to Central Asia from the central part of the country, the northwest and North Caucasus regions as well as the Volga. Calculations point out that the distance of lumber shipments via Makat from north and northwest regions of the European part of the RSFSR to Central Asia is greater than the distance from Central

Table 36

Lumber Imports to Central Asia in 1957-1959, 1000 t*

1 Районы отправления	2 УзССР		3 Турк. ССР		4 Тадж. ССР		5 Всего	
	1957	1959	1957	1959	1957	1959	1957	1959
а Центральный	22,0	13,3	7,0	0,3	4,6	1,1	33,6	14,7
б Северо-Западный	2,6	2,2	0,1	0,1	1,0	0,14	3,7	2,44
в Поволжский	16,0	19,3	14,5	2,4	2,3	1,8	32,8	23,5
г Северо-Кавказский	4,5	10,4	0,1	1,0	0,7	1,2	5,3	12,6
д Уральский	290,2	110,0	42,1	13,0	21,3	12,0	353,6	135,0
е Западно-Сибирский	252,6	327,8	76,3	81,1	57,8	68,8	386,7	477,7
ж Восточно-Сибирский	1640,8	2135,8	338,2	459,0	422,8	563,1	2401,8	3157,9
з Дальневосточный	9,4	10,0	—	0,7	0,2	0,8	9,6	11,5
и Украинская ССР	5,1	2,6	0,1	0,1	0,08	0,1	5,28	2,8
к Молдавская ССР	—	0,1	—	—	—	0,1	—	0,2
л Белорусская ССР	0,2	0,07	—	0,1	—	—	0,2	0,17
м Западный	0,7	—	—	—	0,02	—	0,72	—
н Закавказский	1,0	0,5	0,5	0,1	0,04	—	1,54	0,6
о Казахстанский	28,0	13,6	5,4	4,3	2,2	2,4	35,6	20,3
п Всего	2273,1	2645,67	484,3	502,2	513,04	651,54	3270,44	3859,41

Legend: see table 33; 1 -- Region of origin, 2 -- Uzbek SSR, 3 -- Turkmen SSR, 4 -- Tadzhik SSR, 5--- Total

*Table drawn up by figures of the Mechnized Registration Factory of the Tashkent Railroad.

Asia to Siberia. It is true that the distance of shipments of lumber from the Volga, the central part, the Urals to Central Asia will become shorter, but these regions cannot possess great timber reserves. These regions will hardly be able to supply Central Asia with enough lumber. It follows from the above that in the future lumber imports of 1.1 million tons from the European part of the USSR to central Asia are hardly feasible and the determined amount of lumber imports is exaggerated. The requirements of Central Asia for lumber will be six million tons in the future,[13] and it will be chiefly shipped from Siberia, only partially from the European part of the USSR. The importance of this line is tremendous. First of all the Kungrad-Makat-Aleksandrov Gay Line will aid in the total development of the economy of the Amu-Dar'ya Basin, farming on the Ust-Urt Plateau, the further development of the Embinskiy Oil Fields, it will lighten the load of the overloaded Kinel' Route and make it possible to cut capital investment necessary for increasing its traffic capacity. In addition, this line will make it possible to decrease the distance of goods shipments, the needs of rail transport for rollingstock and finally production outlay. Capital investment necessary for building this line will be paid for first of all through an increase in labor productivity, that is through a decrease in the cost per unit of both transport output and in industrial and agricultural products. A decrease in the cost of transport output takes place chiefly through a decrease in the length of hauls (Table 37).

Calculations indicate that the distance for hauling goods from the western part of the country to the Uzbek SSR, due to the construction of the line, will decrease 440 km, to the Turkmen SSR -- 1,068 km. We shall endeavor to elucidate the method of determining the economic effectiveness of capital investment in new railroad construction, which will make it possible to decrease rolling stock mileage. A decrease in the distance of freight hauls will provide double savings to the economy: one-time savings and savings in annual operations expenses, which is important for determining the economic effectiveness of capital investment in new railroad construction. The one-time savings are obtained through cutting the number of locomotives and freight cars needed, as well as the amount of freight in transit, and savings in operational expenses -- through a cut in shipping costs. 1. The methods of determining the one-time savings in locomotives and freight cars are as follows: a) determination of freight turnover, freight turnover can be determined by calculation, proceeding from the size of interregional and intraregional commercial intercourse of regions served by the new railroad. Proceeding from freight turnover, it is necessary to determine

the required number of working locomotives and freight cars both for the planned railroad and the existing. The total number of freight cars is determined by the formula N=F x U, where N -- working freight cars, F -- freight car turnover in 24-hour periods, U -- average-daily freight car load. The average daily load can be determined by the formula

$U=\frac{Q \cdot a}{365 \cdot a \cdot y}$ where Q -- freight turnover per year, 365 -- number of days in year, q -- freight capacity of car in tons, y -- freight car load capacity use coefficient, a -- coefficient of freight car load unnevenness. In determining U it is essential to consider that in the future a large amount of goods will be hauled in 6-axle, 90-100 ton cars. About 40% of all goods are hauled in 6-axle and 60% in 4-axle cars, and therefore U must be determined separately, that is for 6-axle cars:

$U_6=\frac{Q \cdot 0,4 \cdot a}{365 \cdot q_4 \cdot y}$, for 4-axle cars: $U_4=\frac{Q \cdot 0,6 \cdot a}{365 \cdot q_4 \cdot y}$

After determining the average daily load it is necessary to determine the car turnover. It is determined by the formula

$Q=\frac{l_{full}}{S}$; where l_{full} -- complete freight car run, km, S -- average daily car mileage. The full car run is composed of loaded and empty, that is $l_{full} = l_{em} + l_{lo}$. For l_{lo} we can take the actual distance between regions in economic correspondence, and the amount of empty mileage is determined proceeding from the percentage of empty mileage to loaded. At present this index is 41%, but in future calculations it will be necessary to take less, since with a further improvement in distribution of productive forces, regulation of empty freight car runs and planning shipping the empty mileage value will be decreased. Car turnover is determined:

$Q=\frac{l_{lo} + l_{em}}{S}$. After it is necessary to determine the re-required number of six and four-axle cars individually. The working number of freight cars for six-axle cars -- $N_6 = F \cdot U_6$, for four-axle -- $N_4 = F \cdot U_4$. After determining the number of freight cars both for a new railroad and existing, the difference is determined, which provides savings in operating freight cars. It is determined according to the following formula:

$$E_c = N^{ex}_4 - (N_6+N_4)^{new}$$, where E_c -- savings in total cars needed, N^{ex}_4 -- working number of

Table 37*

Decrease in Hauling Distances Between Central Asia and the Western Regions of the Country in View of the Building of the Kungrad-Makat-Aleksandrov Gay Railroad Line, km

а Район СССР	б УзССР			с ТуркССР		
	по существ. линии	по новой линии	сокращение расстояния	по существ. линии	по новой линии	сокращение расстояния
	d	e	f	d	e	f
g Прибалтика	4700	4156	—544	5582	4381	—1201
h Центр Европейской части	3700	3202	—498	4582	3427	—1155
i Северо-Запад Европейской части	4330	3828	—502	5212	4053	—1159
j Поволжье	2800	2297	—503	3682	2522	—1160
k Белоруссия	3993	3640	—353	4875	3965	—910
l Украина	4160	3660	—500	5042	3885	—1157
m Молдавская ССР	4772	4199	—573	5642	4424	—1200
n Север Евр. части	4640	4235	—405	5532	4460	—1072
Урал	2595	2490	—105	3477	2876	—601

Legend:
a -- Region
b -- Uzbek SSR
c -- Turkmen SSR
d -- On existing line
e -- On new line
f -- Decrease in distance
g -- Baltic
h -- Center of European part
i -- northwest of European part
j -- Volga
k ---Belorussia
l -- Ukraine
m -- Moldavian SSR
n -- North of the European Urals
*Table drawn up through calculations.

four-axle cars on existing road. Since the construction of the new railroad will make it possible to shorten hauling distances, as a result of which freight car turnover will be less, a decrease will also be achieved in required working freight cars; in this case we will always observe the relationship $N^{ex}_4 > (N_6 + N_4)^{new}$.

B) Due to a decrease in hauling distance the number of locomotives required also decreases, which is determined by the following formula:

$K = \frac{n_p \cdot s \cdot (1 + b)}{m \cdot S}$; where K -- required number of locomotives, n_p -- working number of locomotives, s -- average daily freight car run, km, m -- freight car makeup of train, S -- average daily locomotive run in km, b -- auxiliary locomotive mileage coefficient.

The required number of locomotives is also determined separately for new and existing railroads. The results of calculations will differ, since the number of working freight cars on the new road is less than on the existing, and therefore $K_{ex} > K_{new}$. The difference $K_{ex} - K_{new} = K_e$ will give the number of locomotives saved. C) Due to a decrease in the length of hauls in view of the building of the new railroad the period required for goods shipment between communicating regions will decrease. However we should note that an acceleration in the shipment of certain goods will make it possible to cut the value of goods in the process of transit. The effect of cutting the shipment time can be determined by the following formula;

$E_{fr} = \frac{P(T^1 - T^2) \cdot C}{T} \cdot K_{en}$, where E_{fr} -- annual effect on cutting amount of freight in transit, rubles; T^1 and T^2 -- time required for goods to be shipped from loading to unloading point on new and existing railroads, hours; C -- average price per ton of goods, divided by ton-km ratio for each commodity in total goods turnover, rubles; T -- duration of annual period, hours; K_{en} -- standard coefficient of capital investment effectiveness.

2. Savings in annual operational expenses. Due to a decrease in the length of hauls annual operational expenses will decrease through a decrease in locomotive and freight car mileage. A decrease in locomotive and freight car mileage will make it possible to cut the requirements of rail transport for train and locomotive crews, expenditures for heating and lighting locomotives, etc. We determined to show the decrease in freight car mileage due to a decrease in the length of hauls. For this it is necessary to determine the

necessary number of four- and six-axle cars for hauling a given vulume of freight according to the formula:

$n_6 = \frac{Q \cdot 0.4 \cdot a}{q_6 \cdot y}$. For four-axle cars: $n_4 = \frac{Q \cdot 0.6 \cdot a}{q_4 \cdot y}$,

where n_6 and n_4 -- number of six- and four-axle cars necessary for hauling a given volume of freight. The number of cars necessary for hauling the given volume should be determined both for the new and existing railroads. The effect produced from decreasing freight car mileage is determined by the formula: for six-axle cars: $E_6 = n6 \cdot m_6 \cdot l_{sav}$, for four-axle cars: $E_4 = n_4 \cdot m_4 \cdot l_{sav}$, where E -- savings in axle-km, m_6 and m_4 -- the number of freight car axles, l_{sav} -- hauling distance saved, km. It follows from the above that a decrease in hauling distances will cut operational expenses. On the basis of the above we can determine the period required for capital investment to be paid for in new railroad construction according to the formula

$t = \frac{A - (dE_{ps} + dE_{tm})}{ZQ_1 \cdot C_1 - ZQ_2 \cdot C_2}$, where t -- period required for capital investment in new railroad construction to pay for itself; A -- capital investment in new railroad construction, rubles; dE_{ps} -- single-time savings in locomotives and freight cars, rubles; dE_{tm} -- effect of decreasing cost of freight in transit, rubles; ZQ_1 and ZQ_2 -- freight turnover of new and existing railroads, tons; C_1 and C_2 -- operational expenses for hauling one ton of freight on the new and existing railroads, rubles.

In determining the economic effectiveness of capital investment in new railroad construction it is necessary to consider also the effect of the development of production in the area adjacent to the railroad, the effect of acceleration of passenger service, etc. Technical progress and new railroad construction will be accompanied by a significant increase in freight service. Freight turnover and primary rolling stock utilization indices on the Tashkent Railroad will increase greatly during the Seven Year Plan (Table 38). Freight turnover on the Tashkent Main Line increased 28% during the past seven years (1952-1958), with an increase of 49% for the present Seven Year Plan. In handling increased freight turnover an increase in train weight will be important as before. Handling the rapidly growing freight turnover during the Seven Year Plan will be done through the radical technical reconstruction of rail transport, which will be one of the basic factors in the further improvement of rolling stock utilization. The gradual transition of main lines in the republic to diesel locomotives will first of all

Table 38

Dynamics of Tashkent Main Line Rolling Stock Utilization Improvement During the Seven Year Plan*

Показатель	a Ед. изм.	1959	1960	1961	1962	1963	1964	1965
f Грузооборот, тарифн. *т/км*	b млн.	18,7	19,6	22,3	23,6	25,0	26,4	27,7
g Пассажирооборот, пасс-*км*	"	1,9	1,8	2,0	2,1	2,1	2,2	2,2
h Грузооборот, приведд. *т/км*	"	20,6	21,4	24,3	25,6	27,1	28,6	29,9
i Оборот грузового вагона	c сутки	3,6	3,6	3,6	3,58	3,55	3,53	3,5
j Средний вес грузового поезда брутто	d *т*	1810	1860	1920	1980	2040	2110	2190
k при паровой тяге	*т*	1650	1442	1411	1307	1240	800	800
l при тепловозной тяге	*т*	2016	2130	2140	2175	2195	2255	2365
m Статическая нагрузка на вагон	*т*	18,9	19,16	19,2	19,3	19,4	19,5	19,6
n Среднесуточный пробег вагона	e *км*	185,5	206	207	210	210	210	210
o Среднесуточный пробег локомотива с передаточными и вывозными поездами	"	305	360	387	426	448	500	500
p тепловоз	"	520	560	540	545	550	555	560
q паровоз	"	250	260	265	275	260	240	200

Legend: a -- Unit of measurement, b -- Million, c -- 24-hour periods, d -- Tons, e -- km, f -- Freight turnover, rate t/km, g -- Passenger service, passenger km, h -- Freight turnover, i -- Freight car turnover, j -- Average gross freight train weight, k -- With steam locomotive, l -- Diesel, m -- Static freight car load, n -- Average daily freight car mileage, o -- Average daily locomotive mileage with transfer and outgoing trains, p -- Diesel locomotive, q -- Steam locomotive

*From the Seven Year Plan for the development of the Tashkent Railroad. The plan is being fulfilled ahead of schedule.

improve freight car turnover, increase the average daily mileage and increase train weight. Gross train weight will increase 350 tons, average daily locomotive mileage -- 40 km, etc. A decrease in train weight with steam traction and a decrease in the average daily locomotive mileage during the Seven Year Plan is due to the gradual replacement of the steam locomotive by diesel on main lines. During the Seven Year Plan, although freight car turnover will decrease by 0.3 days, this will provide great savings to the economy. According to our figures, savings from cutting requirements for freight cars through decreased freight car turnover will total about 3 million rubles.

Passenger service during the Seven Year Plan will increase chiefly through an increase in local and suburban service, as well as between the republics of Central Asia. The size of direct passenger service will not increase. However, en route passenger service will improve greatly. The total number of passenger cars will be supplemented by all-metal cars; first-class, pullman (two-berth compartments), with many conveniences for the passengers. During the Seven Year Plan a major change will take place in the freight turnover structure of the republic's rail transport: shipments of petroleum products will increase not through importation from other economic regions but by a significant increase in oil refining at the Vannovskiy and Fergana Oil Refineries. An increase in the shipping of petroleum products is due to the mechanization of farm jobs, the total mechanization of cotton farming, an increase in motor vehicle transport, maximum mechanization of road-building and irrigation projects, etc. The application of industrial methods in construction changes the structure of building material shipments. The extensive application of this method not only will accelerate the rate of construction jobs but will bring to a minimum the transfer of brick by rail. On the other hand, this method will increase shipments in cement, gravel, sand and rock. Shipments of building materials during the Seven Year Plan will increase by 80%, and cement -- almost 500%. An increase in cement shipments will take place primarily through an increase in local production. This will greatly decrease the amount of cement hauled in from the Volga, Ukraine, Urals, and other economic regions. Grain shipments will increase both through an increase in grain production in the republic as well as grain hauled in from Kazakhstan and Siberia. The length of grain hauls can be decreased, eliminating existing counter-shipments of wheat, cutting down the importation of wheat flour, etc. During the Seven Year Plan the volume of goods hauled in long distances (mineral fertilizers, cement, wool fabrics, footwear, underwear, knit garments, textile

items, consumer goods) will be cut, but shipments will increase by production increase in the republic. Coal imports from Karaganda and the Kuzbass will be cut almost totally; railroad shipments of coal will increase slowly, although coal extraction in Angren, Shargun and other central Asian coal beds will increase. This is due to the fact that by the end of 1965 about 3 million tons of coal extracted in Angren will be used locally. The primary cause for the retarded growth in coal shipments is the extensive introduction of gas to industrial enterprises and homes on the basis of inexpensive Bukhara natural gas. A transition of republic industrial enterprises to natural gas will not only greatly change the structure of freight shipments but will provide great savings to the economy. As a result of shifting the Samarkand Tannery imeni Akhunbabayev to natural gas the state in 1959 saved 557,000 rubles, the Metalloposuda Plant -- 31,500 rubles, the shoe factory -- 139,000 rubles, etc. Under the conditions of our republic particular attention should be devoted to the development of refrigeration facilities, since in the future grape growing, truck farming, and melons will be greatly developed. In the future we will increase the flow of fruits and vegetables to the eastern regions of the country and the Urals, as well as the center of the USSR, that is the perishable goods transport volume will increase. In order to improve the quality of freight operations in hauling perishable goods it is necessary first of all to reconstruct the existing refrigeration plants, build new ones and make extensive use of trains with electric heating and mechanical refrigeration. The output of cheap electric power[14] in the republic will make it possible to build a number of stationary ice plants, provide mobile ice plants with power and utilize isothermic freight cars with electric heat.

During the Seven Year Plan the republic will continue to use Siberian lumber. However, shipment volume will not increase greatly, due to the extensive use of the industrial method in construction. Cotton shipments will increase greatly. Shipments of cottonseed oil alone will increase 62%, /Linta/ and down -- almost double. Cotton shipments by 1965 will occupy one of the leading positions in freight turnover on the railroad. More than four million tons of cotton alone will be shipped by railroad. Therefore a greater efficiency in shipping cotton by decreasing the irregularity of shipments, routing shipments, developing of mixed rail-water service, improved utilization of freight car capacity, loading of cotton containers in the empty freight cars for the return trip, etc. are of great economic importance. Of particularly great importance in the economy is a decrease in the irregularity of cotton shipments. This not only facili-

tates rhythmic operations of rail transport but of cotton mills, makes it possible to save tens of millions of rubles. We shall breifly examine the influence of irregularity in shipping cotton on rail transport. Cotton traffic both for the USSR railroads as a whole and individual roads is distributed unevenly throughout the year. This is due to the seasonal nature of cotton production. The basic main cotton route of the USSR is the Tashkent railroad, which hauls 2/3 of the country's cotton shipments. Cotton shipping is concentrated in October, November, December and in the first quarter of the year. The maximum load occurs in the fourth quarter, that is during the greatest period of load for the cotton mills, and the minimum in the third quarter, that is during the period of repairs on cotton mills (Table 39).

The relation of the maximum month operations with average monthly operations for the year will express the irregularity of the load by months for the year on the average. The irregularity coefficient for cotton in 1958 was 1.7, in 1959 -- 1.6%. Irregularity in cotton shipments is observed not only by months but by 10-day periods. Each cotton loading station works irregularly during the course of a month. At the beginning and middle of a month, that is during the first and second ten-day periods, the station fulfills the monthly loading plan by 50-60%, while in the third ten-day period frequently 40% and more of the monthly cotton loading is carried out. This is due both to the length of the third decade and the accelerated operations of cotton mills at the end of the month. Transport facilities and labor during the year are distributed and utilized irregularly. The first and fourth quarters are the periods of maximum utilization of plant production capacity. During the third quarter the plants are subjected to repairs before the following harvest or greatly decrease cotton processing, that is the utilization of their production capacity drops to 20-25% (Table 40).

It is obvious from Table 40 that the mills operate irregularly throughout the year, particularly the Uchkurgan Cotton Mill. The average duration of cotton mill operations in the republic is 222 work days. Consequently, the irregular cotton load is a factor exerting a negative influence on the utilization of the production capacities of all cotton cleaning mills. We should note that although cotton shipments and cotton production are of a seasonal nature, the consumption of products obtained after processing cotton fiber at textile combines is of an even nature. Irregular operation of cotton mills is as a rule due to exhaustion of the supplies of raw materials long before the new harvest. One of the causes of irregularity of cotton shipments in our opinion

Table 39

Irregularity of Cotton Shipments on the Tashkent Main Line in % to Annual Load

Год	a Январь	b Февраль	c Март	d Апрель	e Май	f Июнь	g Июль	h Август	i Сентябрь	j Октябрь	k Ноябрь	l Декабрь
1958	9,5	8,72	10,11	8,73	7,77	6,19	2,5	0,55	5,7	14,62	12,39	13,17
1959	9,91	9,0	9,16	8,76	7,8	5,53	2,31	1,08	9,18	13,65	11,51	11,21

Legend: a -- January, b -- February, d -- March, d -- April, e -- May, f -- June, g -- July, h -- August, i -- September, j -- October, k -- November, l -- December

Table 40

Uzbek SSR Cotton Cleaning Mill Cotton Loads in 1959, %

Месяц	1 ст. Наманган	2 ст. Учкурган	3 ст. Андижан
a Январь	9,58	12,55	11,84
b Февраль	8,35	9,45	8,8
c Март	8,65	10,7	11,2
d Апрель	9,59	7,1	9,72
e Май	8,8	3,82	8,4
f Июнь	4,6	0,2	5,3
g Июль	1,26	1,18	0,4
h Август	0,3	0,35	0,42
i Сентябрь	10,41	11,8	9,62
j Октябрь	18,55	18,27	13,0
k Ноябрь	10,54	14,22	10,2
l Декабрь	11,27	10,86	11,1
4 Всего за год	100,0	100,0	100,0

Legend: see Table 39 1 -- Namangan Station, 2 -- Uchkurgan station, 3 -- Andizhan Station, 4 -- Total for year

is stoppage in cotton shipments to procurement centers. Raw cotton picked from kolkhoz fields is sent chiefly to procurement centers and from there to cotton mills. On the average in September 12-16% of the season's total harvest is sent to procurement centers, in October 45-50%, in November 25-30%, December 3-5%. A study of this problem indicates that many procurement centers in the course of a year procure more raw cotton than their warehouse facilities allow. This occurs because the maximum supply of raw cotton at procurement centers is expected in December. After this no more raw cotton is sent from the kolkhoz fields, while shipment of raw cotton to cotton mills continues. Therefore, warehouse facilities of procurement centers in December correspond to the total procurement of raw cotton minus the cotton shipped out for the four months, that is $S = Q_r - Q_4$, where S -- total area of procurement center warehouse facilities, Q_r -- total raw cotton procured by procurement centers in year, tons, Q_4 -- total raw cotton shipped from procurement centers to cotton cleaning mills in four months, tons. At present warehouse facilities for produrement centers correspond to the maximum supply of raw cotton in December. This is achieved due to an increased shipment of raw cotton in September, October, November and December from procurement centers to cotton mills. About 40-45% of all cotton procured during the year is shipped from procurement centers to cotton mills in the fourth quarter. This will make it possible to free appropriate warehouse facilities for receipt of regular cotton consignments. It follows from the above that one of the important causes of the irregularity in cotton shipments is the increased outshipping of raw cotton from procurement centers to cotton mills during the harvest due to the shortage of warehouse facilities both of procurement centers and cotton mills. In the fourth and first quarters mills operate on three shifts, and for the rest of the year one and two shifts. This exerts a negative influence on the utilization of production capacity of mills, labor, electic power, etc. In addition, irregular operations of cotton mills through the year has a negative influence on the operations of rail transport. Due to the seasonal nature of cotton shipments reserve freight cars and locomotives are necessary, and it is imperative to increase the traffic capacity of railroad lines. In 1959 the 24-hour load during the initial period of seasonal cotton shipments on the Tashkent railroad was 110,000 tons or 2444 cars calculated at four-axles (four-axle car load -- 45 tons). Correspondingly, for the preceding period the average daily load was 12,837 tons or 285 cars. The difference in daily load was 2,444 - 285 = 2159 cars or 97,155 tons. The use period for reserve facilities comes from freight car turnover with

cotton fiber at average cotton haul distance of 2700 km and average daily mileage of 260 km, and loaded cotton freight car turnover will be:

$$\frac{2700 \cdot 2}{260} = 20.7 \text{ days.}$$

Taking into consideration reserve time the period for reserve use can be counted as 21 days. Hence the maximum reserve value for providing cotton shipments will be 97,155·21 = 2,040,255 tons of freight car load capacity, with 11.25 tons per-axle load. If we consider that the accumulation of reserve begins three months before the beginning of the season, the duration of the existence of reserve will be 30 X 3 + 21 = 111 days. Then average annual value for boxcar reserve for handling cotton shipments will be:

$\frac{2040255 \cdot 111}{4 \cdot 365}$ = 155,115 tons, car-days will be: $\frac{2152 \cdot 21 \cdot 109}{4}$ = = 1,235,488. Boxcar reserve value will be: $\frac{1,235,488}{365}$ = 2284 cars. In cash expression: 3384·3,740 rubles = 12,656,000 rubles, where 3,740 rubles -- price per four-axle car without brake platform. Consequently, after cutting down the unevenness in cotton shipments there will be no necessity for a reserve of freight cars. A decrease in the irregularity of cotton shipments will make it possible to shift cotton cleaning mills to two-shift operations, due to which the production capacity of mills will be utilized evenly throughout the year. This is of great economic importance, since rhythmic operations by cotton-cleaning mills during the course of the year will make it possible to process more raw cotton and will save on capital investments necessary for building new mills. Calculations point out that due to rhythmic operations of cotton-cleaning mills it is possible to process a supplementary 1.4 million tons of raw cotton per year.

Radical technical reconstruction of railroads, improvement of rail operations will make it possible to cut shipping costs in the economy to a great extent. During the period of the stepped-up building of communism the importance of truck transport in the republic's economy increases sharply. The rapid development in industry, agriculture, new railroad construction, tremendous freight and passenger service by rail -- all of this is possible with well-organized transport links between industrial and agricultural regions, railroad stations and river landings with the peripheral areas and all regions in the republic with each other. This will require the further development of motor vehicle transport. The basic trend in the development of motor vehicle transport is the radical reconstruction of motor vehicle transport and the road sys-

tem will lead to technical progress, expansion of the road system by improving roads, maximum mechanization of road building operations, extensive centralization of truck shipments by general use truck firms, elimination of small motor pools by amalgamation and development of auto repair facilities, specialization of trucks in use. An increase in the number of trucks in the republic should progress in two directions: large 7-10 ton trucks and more, and 1.5 ton trucks and under. The further industrial development of the republic, extensive application of the industrial method in construction of industrial and civil installations, and the working of quarries require large-capacity trucks, particularly dump trucks. These will be used in the mining, metallurgical and construction industry. The use of such machines will heighten the question of increasing the strength of road structures. At present only 35% of these structures permit the passage of heavy trucks. For the more efficient utilization of heavy trucks the extensive use of truck and trailer rigs with semi-trailers is essential. With this the load on bridges and other structures is cut almost in half. The condition of roads must be taken into consideration in developing motor vehicle transport in our republic. At present third class roads make up 74% of the total road system. These roads link almost all farm areas with industrial centers. Large freight traffic originates in regions served by these roads. The operation of heavy trucks on third class roads is almost impossible and the condition of bridges and other structures will not allow this. Therefore the specific nature of the road system in the republic requires trucks adapted to the conditions of the Uzbek republic. Such vehicles could not only haul freight but also could be used for hauling trailers and could travel poorer roads. For this the trucks should have at least two drive axles. Experience has shown that not always and not everywhere is it necessary to haul several tons of freight. Frequently small consignment shipments are transported of 0.5, 0.7 and 0.8 tons, in the shipment of which the carrying capacity of trucks is used inefficiently. In order to achieve a more efficient utiliation of trucks and maximum satisfaction of the needs of the economy for shipping with minimum expenditure, small 0.8-1.5 ton trucks must be furnished. The climatic conditions of Uzbekistan require rapid shipment of milk, meat and other perishable goods. Special refrigerator trucks must be furnished. Analysis of the development of productive forces in the republic for the future indicates that motor vehicle transport will play the major role in suburban passenger service and will be important in interurban service. In large cities 80-100 seat buses should be put in operation,

in oblast and rayon cities -- 50-70 seats, interurban service -- 40-60 seats. An increase in motor vehicles in the republic should be combined with efficient utilization. The primary means of improving motor vehicle operations is a sharp increase in the ratio of public motor vehicle transport. In recent years, that is after the reorganization of the administration of industry and construction, dwarf motor pools gradually were amalgamated into large units. This was of great economic significance, but nevertheless up to the present day small motor pools continue to exist. In 1959 the total number of motor pools was cut by more than 150 units in comparison with 1958, while units with up to 10 vehicles were cut by more than 350 units in the same period. In 1958-1959 more than 2000 trucks were transferred to the public truck transport system. The freight volume of general use truck transport in the last three years increased from 490.4 million ton/km to 639.7 million t/km, or 30%. The ratio of general use truck transport in total motor vehicle service during the first year of the Seven Year Plan was 27.2%, and in freight turnover -- 30%. The interests of the national economy, in view of the continually growing volume of freight shipments, require that freight be hauled not by departmental trucks but by public use trucks; shipping costs will average 40% less. In increasing the ratio of general use motor vehicle transport in hauling freight an important part was played by the sovnarkhozes, which in 1960 were joined into a single Uzbek sovnarkhoz. This should aid a further amalgamation of small motor pools and increase the ratio of public use vehicles, since even the sovnarkhozes had small motor pools. In 1958 the Tashkent Sovnarkhoz had 174 motor pools, the Fergana -- 99, Samarkand -- 55, Bukhara -- 51 and Karakalpak -- 31, while the average number of vehicles per motor pool ranged from six to fourteen.[15] It would be advisable to merge existing small motor pools with motor pools of the Uzbek sovnarkhoz and organize locally transport organizations which could handle not only sovnarkhoz enterprises but other institutions as well. In each oblast in the republic, depending on the volume of freight, it is necessary to create motor vehicle transport organizations with local truck complements. For the efficient utilization of motor vehicles it is necessary to combine amalgamation of motor pools with a transition to cost-accounting. At present not all motor pools in the sovnarkhoz have shifted to cost accounting. In 1958 the number of motor pools shifted to cost accounting in the Tashkent sovnarkhoz totalled 10, in Fergana -- 8, Samarkand -- 11, and in the Bukhara and Karakalpak sovnarkhozes not a single one.[16]

The industrial and agricultural development of the

republic makes it feasible to specialize vehicles by nature of the job done. Specialization of trucks will increase vehicle productivity, will speed up goods delivery and decrease shipping costs. Proceeding from the characteristics and specific nature of the jobs of each region, it is necessary to have specialized trucks in large motor pools. Motor pools in cotton growing areas should have trucks for the bulk shipment of raw cotton, construction areas -- asphalt carriers, cement and concrete carriers, in large cities -- refrigerator trucks and tank trucks for hauling petroleum products. On the basis of motor pool amalgamation, truck specialization and an increase in the ratio of public use motor vehicle transport an extended development of centralized freight shipments will be of great benefit to the economy. Right now there is relatively little centralized shipping. Centralized shipments would not only cut shipping costs but would increase labor productivity, which is extremely important during the period of the creation of a material-technical basis for communism. Centralized shipments have a great future, for they will improve the quality of freight operations and client service. For the development of centralized shipping for public use trucking capital investment is not required, but we must overcome the departmental approach to the utilization of trucks and achieve intelligent operational leadership. Centralized shipments include certain industrial goods as well as cotton. However, within the cities of Tashkent, Samarkand, Andizhan and others a large quantity of goods belonging to offices, enterprises, trade organizations, etc. are carried. A large number of trucks are involved in the hauls, and they are frequently utilized inefficiently. Therefore a significnat portion of hauls in large cities should be centralized. This would produce great savings and would cut down the required number of trucks.

An increase in the number of motor vehicles in the republic brings up the problem of repair facilities. In 1959-1965 motor vehicles will increase 61%, including trucks -- 48%, buses by more than 210%, passenger cars -- 80%, etc.[17] In 1958 there were 13.7 vehicles per repair facility, in 1959-1960 14.8. In amalgamating the motor vehicle repair facilities it would be advisable to go on the assumption that in a 5-6 month term of service a truck averages 300-350,000 km and one time in the shop for major repairs.[18] Efficient displacement of repair enterprises is determined by the number of motor vehicles in each area; the capacity of auto repair enterprises should satisfy the requirements for motor pools in the region for major repairs. This will make it possible to eliminate long motor vehicle hauls between oblasts for repairs. In the future Tashkentskaya Oblast will continue to contain a great number of motor vehicles, and there-

fore the oblast should have two auto repair plants, in Tashkent and Almalyk, for 4000 and 1000 major repair jobs per year respectively. The lower Amu-Dar'ya should have an auto repair plant in Nukus for 1500, Bukhara for 1000, for Surkhandar'inskaya and Bukharskaya, Samarkand should have a plant for 2000 for Samarkandskaya Oblast and Leninsk for 3000 major repair and unit jobs per year for the Fergana Valley. Requirements for bus repairs are determined by the calculation that the average yearly mileage on buses is 40,000 km, while 280,000 km are needed to write off a bus, consequently more that 900 major and unit repair jobs will be needed by 1965. It is well known that each state office, enterprise and ministry alongside trucks, had passenger cars which were also used inefficiently. The problem of the efficient use of passenger vehicles was raised at the 20th Party Congress... "Clear wastefulness is being allowed in the use of passenger vehicles. It is necessary to make a decisive shift to socialist initiative in this matter, eliminating the practice of assigning cars to individuals, establishing a strictly limited number of personal automobiles."[19] The use of passenger cars by various ministries, departments, officer, enterprises as taxis doubtlessly aided in improving the fulfillment of the requirements of the public for this type of transport. A further population growth and standard of living will require an increase in the number of taxis. In the Seven Year Plan alone the number of taxis will increase 250%. For this the extensive incorporation of taxi dispatchers with the aid of radio is necessary. This will greatly improve the quality of taxi service. The further development of motor vehicle transport is organically connected with an improvement in the technical condition of roads. The primary types of roads in the republic will be gravel blacktops and gravel non-blacktops, made by mixing Dzharkuragan petroleum or liquid asphalt. The availability in the republic of large quantities of gravel and the capability of handling traffic the year around on gravel roads, as well as the advantages of gravel over stone make its extensive use necessary. During the years of Soviet authority motor vehicle transport increased greatly, but the rate of growth of industry and agriculture in the republic require the reconstruction of existing roads, an increase in their length with maximum mechanization of road construction and efficient utilization of road building machinery. For removing dirt and transferring it short distances excavators are used, graders and bulldozers for evening the surface, tamping machines for packing the roadbed, ditch-cleaning machines for cleaning ditches, asphalt-laying equipment for laying asphalt, mobile concrete mixers for preparing asphalt-concrete. In addition, it is necessary to make wide use of

scrapers, trailers, truck cranes, graders, mechanical loaders and other modern machinery. The republic's road system should develop particularly in the Southwest region of the republic due to the discovery of rich gas deposits, farming and irrigation of new land on the Karshi Steppe on the one hand and relatively poor condition of the road system on the other. The presence of stone road-building materials in the southwest region will aid in speeding up the reconstruction of the road system. For Sukhandar'inskaya Oblast of great importance is the reconstruction of the Karshi-Samarkand Road, 81 km long, Karshi-Kassan -- 30 km, Shakhrisyabz-Miraki -- 26 km, Kassan-Mubarek-Kagan -- 110 km, Chirakchi-Kassan -- 97 km. These roads interconnect major industrial and agricultural centers by direct route and will aid in the farming of the Karshi Steppe. The reconstruction of the republic highway Karshi-Samarkand will greatly improve economic links between the two neighboring oblasts. The road system of Samarkandskaya Oblast also needs to be developed. First of all it is necessary to reconstruct the following important oblast roads: Dzhuma-Kattakurgan, 50 km long, Mitan'-Kushrabad-Nurata -- 130 km, Khatyrchi-Lyangar -- 50 km, Dzhizak-Farish -- 67 km, Kermine-Nurata -- 49 km, etc. During the Seven Year Plan kolkhoz roads in Samarkandskaya Oblast also should be reconstructed. Kolkhoz roads with a great intensity of traffic should be gravel. Such kolkhoz and sovkhoz roads as Karadar'ya-Ishtykhan -- 24 km long, Urgut-kolkhoz imeni Stalin -- 10 km, Narimanovo-kolkhoz imeni Engel's -- 6 km, Samarkand-Plem-sovkhoz No 1 -- 8 km and many others should be reconstructed in coming years.

A distinguishing feature in the development of roads is their extension through improved roads and the mechanization of earth-moving operations. During the Seven Year Plan 2250 km of roads of republic, oblast and local importance are to be built and reconstructed, as well as 1500 km of kolkhoz roads. In view of the discovery of a gas deposit in Gazli, in 1958 construction began on the Bukhara-Gazli road -- 125 km long. This road is extremely important for transforming Gazli into a major town, supply of the necessary materials, gas extraction, etc. In 1959 an earth roadbed was built on the Bukhara-Gazli Road. Constantly increasing commerce in Tamdynskiy Rayon requires the gradual changeover of the Kenimekh-Tamdy Road, 200 km long, from one type of surface to another. The reconstruction of such roads in Bukharskaya Oblast as Navoy-Kenimekh, 28 km long, Kalkanata-Nurata-- 30 km, Kenimekh-Yangikurgan -- 22 km, Navoy-Kalkanata -- 6 km, Kzyltepe-Kuyumazar -- 24 km, Kenimekh-Nurata -- 5 km and others will further to a great degree an improvement in the road system of the oblast. An extension of improved roads

in other oblasts in the republic will make it possible to make better use of vehicles and handle the increased freight volume. The great part of freight turnover by vehicle will be handled on improved roads. During the first year of the Seven Year Plan the Tashkent-Angren-Kokand Main Highway was opened, 248 km in length. The construction of this main highway began in 1956. The highway was built simultaneously from both ends. Work was done under mountain conditions and involved rock work. On the section where the highway crossed the Syr-Dar'ya, a combined ferroconcrete bridge was built. On certain sections the road went up to an elevation of 2250 m above sea level. The Tashkent-Angren-Kokand Main Highway is very important in the republic's economy. First of all it joins Tashkent and the Angren mining-industrial region with the Fergana Valley by the shortest route and cut the distance for hauling freight. The distance for rail shipping goods between Tashkent and Kokand is 342 km, while by highway it is 210.

shipment from Tashkent to Fergana by rail spent an average of 40-50 hours in transit, while on trucks -- no more than 12 hours. This is particularly important in hauling urgent industrial and highly perishable goods, as well as passengers. Many employees of planning organs err in thinking that since shipping costs on the Tashkent Railroad are 0.37 k per t/km, while on trucks no more than 6.5 k per t/km, it is better to handle freight be rail. The cost of hauling freight by rail is determined, taking into consideration many factors, including the length of hauls -- 500-600 km. In hauling goods by rail for short distances (20-30 km) the cost of shipping will be higher than with trucks. Therefore, on the Tashkent-Kokand main line the cost of trucking, as calculations have shown, will be slightly higher than the cost of rail ahipping, but the period required for the goods to be delivered is much less.

Of the economic regions in the republic the Karakalpak economic region, by level of development of productive forces, as a whole and the road system in particular, is far down on the list. The low level of road system increases not only shipping costs but production costs. Differing from many oblasts, on the lower Amu-Dar'ya we have river transport which, like trucking, plays an important role in inter-oblast shipping. In determining shipments between river and truck transport under lower Amu-Dar'ya conditions, it is necessary to compare the cost of shipping on these two types of transport. The sphere of use of truck and river transport and their further development require the total solution to transport problems. The total development of river and truck transport require the reconstruction of roads on approaches to river landings, specialization of trucks, de-

pending on the type of goods being transported, reconstruction of river landings, clear-cut organization of river traffic. The proportionate and total development of these types of transport will make it possible to carry out mixed truck and river shipments on the lower Amu-Dar'ya. The lower Amu-Dar'ya has consistent interregional economic ties with the Urals, Kazakhstan, Siberia and the Central part of the country. The maintenance of these ties via Aral'sk aids in more efficient transport-economic ties of these regions. Mixed shipments via Arals'k require the further development of truck-river shipments on the basis of the reconstruction of the road systems and river fleet. The development of the economy of the Kara Kalpak economic region during the Seven Year Plan requires an improvement in the road system. For the efficient utilization of truck transport, as well as for raising the economic and cultural level of the population it is essential immediately to begin reconstruction of existing roads and replace "bridges" by pipes. With a shortage of road-building materials on the lower Amu-Dar'ya, of great importance is sequence in rebuilding existing roads. Results of studies carried out by the Council for Studying the Productive Forces of the Republic of the AS Uzbek SSR, indicated the advisability of rebuilding first of all the most important roads of the lower Amu-Dar'ya, which join groups of kolkhozes and the major industrial enterprises with rayon seats, railroad stations and river landings; Biybazar-Biruni, Turtkul'-Biruni, Biruni-Ferry crossing, Urgench-Chalysh-ferry crossing, Urgench-Khiva, Urgench-Shavat, Urgench-Koshkupyr, Urgench-Yangiaryk, Urgench-Khazarasp, Urgench-Yangibazar, Gurlen-Mangeit, Shavat-Koshkupyr-Khiva-Yangiaryk-Khazarasp, Kipchak-Takhiatash, Khodzheyli-Kungrad, Mangit-Kipchak, Tashauz-Dzhumurtau, etc. There is no question about the fact that these roads will handle most of the truck transport on the lower Amu-Dar'ya. Due to poor quality of roads almost all motor pools along the Amu-Dar'ya consume too much fuel. On the left bank of the Lower Amu-Dar'ya deposits of limestone-coquila and limestone-sandstone are to be found in the vicinity of Khodzheyli, Shumanay II and Kungrad (two deposits). The strength of the rock materials in these deposits -- heterogeneous, changing within the limits of one and the same geological section from 40-1000 kg/sq cm, with predominance of weak materials (less than 2000 kg/sq cm). Supplies of road-building materials on the right bank are in a worse condition. Here basic deposits are the limestone-coquila and limestone-sandstone around Nukus (three deposits), limestone-sandstone the bank of the Amu-Dar'ya, 90 km downstream from Nukus, and Burlytau (30 km to the west of Kegeyli) and siliceous

limestones at Bel'tau (25 km to the north of Takhtakupyr). The strength of the materials in these deposits (excluding Bel'tau) also differs within the limits of one and the same geological section and, for the most part, does not meet the requirements of road building. Deposits of strong stone materials of both sedimentary rocks (limestones) as well as igneous (granodiorites, etc.) at Sultan-Uiz-Dag and its spurs Dzhumurtau and Aktau are located on the bank of the Amu-Dar'ya 100-120 km below Nukus. The strongest building materials, suitable for road cover, are found in tremendous quantities at Dzhumurtau. Mechanized quarrying at Dzhumurtau will aid in improving the condition of roads along the Lower Amu-Dar'ya. During the years of Soviet authority Tashkent was transformed not only into a major administrative but also industrial center. At present large modern plants and combines are operating in the city, closely connected with truck and rail transport. Tashkent industry furnishes a considerable percentage of the republic's production. Every residential district, every industrial and commercial, center, and all schools are all inter-connected, as well as with all other rayons by urban transit. In order to satisfy the requirements of the public for urban transit, in the city there are 11 streetcar, 8 trolleybus and 43 bus lines, as well as passenger and freight taxis. An increase in Tashkent traffic is influenced greatly by the construction of apartment houses at Chilanzar, Aktepe and other districts in the city. For this purpose in 1959 two million tons of inert materials were brought to Tashkent from the Kuylyuk Quarry. In addition, the continually developing commercial network in the city and the production relations of industrial enterprises in the city with other economic regions in the country and republics, as well as the oblast, aid in increasing the role of motor vehicle transport, acting as a connecting link between railroad stations and industrial enterprises. Due to the rapid development of industry in Tashkent, the economic relations of its plants and combines not only with regions outside the republic but with regions in Tashkentskaya Oblast, have increased rapidly. At present many industrial enterprises receive raw materials from Tashkentskaya Oblast and ship their products to the same areas. At the Tashkent Cotton-cleaning Mill raw cotton is received from two procurement centers in Verkhnechirchikskiy and Orkzhonikidzevskiy rayons, from seven procurement centers in Srednechirchikskiy Rayon. The jute-kenaf mill receives fiber from Nizhnechirchikskiy and Verkhnechirchikskiy rayons, breweries No 2 and 3 receive barley from the Karasuyskaya Grain Procurement Center, and waste products are sent to Yangiyul'skiy Rayon for livestock feed; the electric cable plant sends

its products to almost all rayons in the oblast; the dairy in Chilanzar receives its dairy products from Ordzhonikidzevskiy, Chnazskiy, Verkhnechirchikskiy, Srednechirchikskiy and Akkurganskiy rayons. Concentrated feeds (cotton-cake, husks) are hauled from the Yangiyul'skiy Oil Mill by truck to consumers in Ordzhonikidzevskiy, Verkhnechirchikskiy and other rayons in the oblast; oxygen in cylinders is shipped from the Chirchik Electrotechnical Combine to almost all rayons in the oblast by truck, etc. At present freight flow is concentrated on the approaches to Tashkent from four primary highways: Chirchik, Khilkovskiy, Great Uzbek and Chimkent. The freight flow is particularly large on the Great Uzbek and Khilkovskiy highways. The intensity of traffic in the city is increasing through the maintenance of commercial relations between the rayons of the oblast via Tashkent. Each year the cotton-cleaning mill located near the railroad station Veliko-Alekseyevskaya ships to the cotton mill in Keles some of the unprocessed raw cotton along the Great Uzbek Highway through Tashkent. Wool is hauled from the southern rayons of the oblast along the same route to the wool washing mill in Keles, throught Tashkent.

Production economic relations between industrial enterprises of Tashkent and the rayons of Tashkentskaya Oblast on the one hand and commercial relations among the rayons of the oblast through Tashkent on the other constitute the main cause of increased freight flow both on the approaches to the city and in the city itself. In addition an increase in traffic within the city is influenced by many plants located directly in the city. Such plants as Motor Vehicle Repair Plant No 2, Gazoapparat, imeni Il'ich, Pod"yemnik and many others (a total of 17) are located in the city itself, although many of them have no potential for territorial expansion and are very unsanitary. At present Tashkent contains a number of inconvenient features and is overloaded in the organization of interurban and suburban bus service. Buses from Tashkent now operate on 31 interurban and suburban lines. Each line has from 2-6 departures and more per day. Bus stations are concentrated within the city. These interurban and suburban bus lines begin in Tashkent, overlap with urban transit and cause excess traffic. With a rise in the standard of living, population growth both in cities and the oblast rayons, the addition of new buses in the future, etc., interurban and suburban passenger service will increase. Not only the number of lines but the number of departures will increase. A study of the development of the productive forces in Tashkentskaya Oblast in the Seven Year Plan indicates that production-economic ties between industrial enterprises in the city of Tashkent and rayons

in the oblast will develop due to the fact that although during the Seven Year Plan new, large enterprises will not be built in Tashkent, many existing plants and combines will be reconstructed and new industrial installations will appear in a number of rayons of Tashkentskaya Oblast. All of this will greatly increase the traffic in the city itself, will create a number of inconveniences in urban transit, which frequently leads to accidents. For the efficient organization of urban transit and production-economic relations between the industrial enterprises of Tashkent and the rayons of the oblast, we need a belt highway around the city.

According to figures by the State Planning Institute Uzgiproavtodor, freight turnover on a belt highway around the city would be in the future more than 16.5 million tons. The construction of a belt highway around Tashkent, with asphalt surface, is extremely important for the republic's economy. The number of trucks passing through the city will decrease sharply, the number of trucks hauling goods in and out will decrease, and urban transit will be lightened. In addition, things will be more convenient for consignees and shippers, suburban and interurban bus traffic will be more efficient, passenger service will be improved at bus stations, as will the sanitary conditions in the city. In connection with the building of a belt highway around Tashkent, the necessity arises of building new bus stations, which should be placed where highways intersect the belt highway. Worthy of serious attention is the proposal by Uzgiproavtodor, for the construction of a bus station at the intersection of the Great Uzbek Highway and the Belt Highway, near the 54th Station and double-track of the Tashkent main line for bus lines running between Tashkent, Samarkand and other cities in this direction. For bus lines from Tashkent to Angren, Kokand and the Fergana Valley we must build a bus station at the intersection of the Tashkent-Akhangaran Highway and the Belt Highway, etc. Production-economic ties will be maintained along the Belt Highway among all rayons of the oblast, between the industrial enterprises of Tashkent and the rayons of the oblast, the railroad stations Tashkent Freight, Shumilova, Salar, Khamza, Kzyltukumachi and the city's industrial enterprises. In addition, almost all interurban and suburban bus service will be maintained along the Belt Highway. The total length of the Belt Highway around Tashkent will be 54 km, including 6 km of the Chimkent Highway-Tashkent-Kibray, 2.5 km of the Tashkent-Kibray-Chirchik Highway, 14 km of the Chirchik-Kuybyshev Highway, 10 km of the Kuybyshev-Great Uzbek Highway, 4 km of the Great Uzbek Highway-Tashkent, Chimkent. In order to lighten the load of urban transport and to ease transport for factories in the

city, considering the impossibility of their territorial expansion, it is essential to take these industrial enterprises outside of the city and place them near the Belt Highway, which will cut plant shipping costs. At present the construction of the Belt Highway has begun in the area of Station 54 of the Tashkent Railroad as far as Kuylyuk. The highway will continue to the Tashkent-Akhangaran Highway. Here sections of the Belt Highway will pass between the Kolkhoz imeni Zhdanov and the Chirchik River. Further on the highway will pass through Ordzhonikidzevskiy Rayon and then cross the Salar-Barrazh Railroad section, run as far as Dendropark and cross the Chimkent Highway, run as far as station number 53, beyond Oktyabr'skiy Rayon, and past Akteb will connect with the starting point, that is station 54 of the Tashkent Main Line.

Consequently, the Belt Highway around Tashkent will make it possible to improve truck transport greatly. An improvement of economic ties within the oblast and the construction of the Belt Highway around Tashkent will cut shipping costs in the economy. The developing economy of the Republic not only requires the construction of hard surface roads in Uzbekistan itself, but also roads connecting adjoining republics. Uzbekistan, particularly Tashkentskaya Oblast, has close transport-economic relations with Yuzhno-Kazakhstanskaya Oblast of the Kazakh SSR and the northern region of the Kirgiz SSR. In order to improve the economic relations between these regions the Alma-Ata-Frunze-Tashkent-Samarkand Highway was built, along the route of the existing Chimkent and Khilkov routes, connecting Begovat and Uratyube. For a further improvement of transport-economic ties between Uzbekistan and neighboring Central Asian republics, we must accelerate the reconstruction of roads of All-union importance: Zakhmatabad-Pyandzhikent-Samarkand-Bukhara-Farab-Chardzhou, Termez-Stalinabad, Osh-Andizhan-Kokand-Leninabad-Ursat'yevskaya. All of this will increase the network of improved roads on which truck and trailer rigs can be used, and which can be travelled the year round, a condition which is important for expanding the use of truck transport. All of these measures for developing motor vehicle transport will aid in handling the increasing volume of freight and passenger service (Table 41).

It can be seen from Table 41 that during the Seven Year Plan not only freight and passenger service will increase, but also the number of motor vehicles, particularly passenger cars. Right now there are 20.3 passenger cars in Uzbekistan for every 10,000 persons, while in Iran there are 13.3, Burma 6.2, India 1.42, etc. In 1965 the number will rise to 30.3. The further development of motor vehic-

Table 41

Freight and Passenger Service 1958-1959*

Показатель	Ед. изм.	1958	1959	1960	1962	1965
Перевозки грузов**	млн. т	163,3	170,2	185,0	225,0	336,0
Всего						
в том числе:						
автотранспортом общего пользования	"	43,7	46,4	50,0	102,5	155,0
Грузооборот	млрд. т/км	1,96	2,15	2,37	2,9	4,36
Всего						
в том числе: автотранспортом общего пользования	"	0,58	0,64	0,70	1,44	2,18
Пассажирооборот***	млн. чел.	288,3	297,3	365,1	445,3	677,5
Инвентарный парк автомобилей	млрд. пасс/км	1885,6	2072,8	2468,2	3478,0	5737
	%	100,0	108,31	115,70	127,72	161,08
в том числе: грузовых	"	71,91	76,42	79,00	84,35	106,55
автобусов	"	2,80	3,46	4,10	5,56	8,88
легковых	"	25,29	28,43	32,60	37,81	45,65

Legend: a -- unit of measurement b -- freight shipments** c -- total d -- including e -- public use motor vehicle transport f -- freight turnover g -- including public use motor vehicle transport h -- passenger service*** i -- motor vehicle inventory j -- trucks k -- buses l -- passenger cars m -- million tons n -- billion o -- ton/km p -- million persons q -- passenger/km

*from the Future Plan for the Development of Motor Vehicle Transport in the republic.

**including kolkhozes

***passenger service is handled by public use motor vehicle transport

le transport and extension of the improved road system will further a strengthening of the republic's economy, raising the standard of living, decreasing shipping costs, and finally increasing labor productivity. Future river transport will be more important in the economy of the Amu-Dar'ya region. It is essential to consider the specific features of the Amu-Dar'ya, the obsolete fleet, the large amounts of water taken from the Amu-Dar'ya for irrigation and the construction of a number of dams. The development of river transport should be directed primarily toward meeting the needs of regions adjoining the river for interoblast and intraoblast goods shipment. The development of river transport will be influenced greatly in the future by the great removal of water from the Amu-Dar'ya for irrigating the Karshi Steppe and other irrigated regions. Water removal will cause a drop in the water level. This requires the use of vessels with shallower draughts. The Kara Kum Canal and the planned Amu-Bukhara Canal will begin not along the lower Amu-Dar'ya but along the middle course and the upper reaches of the river. This means that on sections where more freight is shipped, the water level will drop. The development of river transport will also be influenced greatly by the irregular river bottom, which makes uneven depths in the navigation section. The closed nature of the river basins makes it impossible to link the republic with the country's river or sea basins. Construction of four dams planned by Soyuzmorproyekt -- Kelifskaya, Kzylayakskaya, Tuyamuyunskaya and Takhiatashskaya -- will form three navigable sections on the river -- the upper Kzylayak, Kzylayak-Tuyamuyun and Tuyamuyun-Takhiatash. On these sections freight operations can be handled by the existing fleet. In order to exit to the Kara Kum Canal Soyuzmorproyekt has planned the construction of locks on the Kzylayakskaya Dam, which will increase freight shipments along the canal and will improve economic intercourse with regions along the river and canal. Canals should be used not only for irrigating kolkhoz and sovkhoz fields, but also for transport purposes, which will be of great benefit to the economy. Utilization of the proposed Amu-Bukhara Canal for navigation will aid in the rapid development of production in the region along the canal, an increase in intraregional economic ties and a decrease in shipping costs, since the cost of trucking in comparison with canal transport is two to three times as high. Organization of navigation on the canals does not require large capital investment. It is sufficient to build a small landing near kolkhozes or sovkhozes and purchase 60 and 90-hp tugs for hauling cargo through the canals. The [illegible] of the Amu-Bukhara Canal will increase also, due to the construction of an exit lock from the canal to the Amu-Dar'ya.

This is important due to the fact that many vessels plying the river and having shallow draughts, can enter and exit from the canal without transfering cargo. Although the building of a canal with an exit lock will increase its cost, experience has shown that a decrease in operating costs, involved in transshipping freight from canal to truck and then to river boat and back, will increase the effectiveness of capital investment in building the canal. In the future the Amu-Dar'ya will be used not only for transport but also for irrigation. In view of the specific conditions of the river the volume of river transport freight shipments will increase during the Seven Year Plan at a rate much slower than the USSR as a whole.

River transport freight turnover during the Seven Year Plan will increase from 0.29 billion t/km in 1958 to 0.56 billion in 1965. Development of productive forces in the Amu-Dar'ya basin will constitute the primary factor for increasing freight shipments on the Amu-Dar'ya and the Sea of Aral. In 1959-1965 freight shipments for the Central Asian State Steamship Lines will increase 16%, and freight turnover -- 29%. During the first year of the Seven Year Plan freight turnover increased 6% over 1958, while an important part of shipments as formerly is occupied by grain, cotton, metal products and machinery, mineral fertilizers, petroleum products, mineral building materials and consumer goods. The basic role in effecting interoblast water shipments will be played by the Amu-Dar'ya and the Sea of Aral. In 1959 the volume of interoblast freight shipments totalled 1,501,400 tons or 24% more than 1958. Such an increase in freight shipments is due to the development of agriculture in the Amu-Dar'ya basin, the changeover of short rail hauls to river transport and a more efficient distribution of freight flow between rail and river transport. In order to handle the increasing volume of freight shipments, maximum mechanization of loading-unloading operations and transshipping operations is necessary, as well as the addition of more economical vessels to the self-propelled and tug fleet. We should note that the tug fleet of the Central Asian Lines, built in 1935-39 for the Amu-Dar'ya, is not appropriate in draught to the depths and habits of the river. This lack of correspondence is felt particularly sharply during the busy fall and spring, when products of harvest are hauled. During this period the river depths are barely 90 cm, whereby tugs draw as much as 1.2 m. This leads to accidents, a slowing down in ship movement, untimely wearing out of vessels and an increase in shipping costs. During the high water period, when depths are sufficient, but the current is strong, the underpowered fleet cannot haul full bar-

ges, a factor which cuts down the speed of movement and all fleet utilization indices. Considering the specific features of the Amu-Dar'ya, it is essential to moderize the fleet for maintaining navigation on the river, particularly in sections where the river depth is the least. Since vessels with metal hulls have deeper draughts, in our opinion it is advisable to make hulls of lighter plastic alloys. The Amu-Dar'ya and Sea of Aral will play an important part in supplying the Lower Amu-Dar'ya with Siberian lumber and grain, hauling cotton to the central industrial regions. An improved fleet will be necessary for handling waterways freight shipments. The lack of correspondence between the present fleet and what is necessary will be even greater throught the construction of the KaraKum Canal, since 4.0 cu km of water flowed from the Amu-Dar'ya to this canal in 1959 (first unit) and 5.0 cu km in 1960 (2nd unit). Water diversion from the river to the canal will decrease river depths. The draught of vessels will remain the same. Consequently, it is already necessary to begin a gradual modernization of the fleet, particularly the tug fleet, replacing steam with diesel. This will increase capacity and decrease shipping costs, as well as make it possible to maintain navigation. For this it will be necessary to increase work on deepening the river and shoring the banks. Navigation on the river is also influenced by the amount of silt in the river. The Amu-Dar'ya is one of the most heavily silted rivers in the world. The quantity of suspended particles in various rivers is as follows (one gm/cu m of water): Amu-Dar'ya -- 3200, Indus -- 2500, Ganges -- 1980, Syr-Dar'ya -- 1920, Nile -- 800, Mississippi -- 630, Volga -- 120. The Amu-Dar'ya deposits much silt in its delta, which forms salt-water marshes. The total amount of silt deposited in the delta is 150 million cu m per year. The figures testify to the necessity of extensive projects for maintaining navigation on the Amu-Dar'ya. Of importance in organizing river freight operations is a deepening and straightening of the channel bed. The river on the Chardzhou-Karatau section is characterized by changeableness of bed, and a large number of limiting posts. During the period of sharp fluctuations of water horizons, at certain spots the depths drop during the course of a few hours from 110 cm to 50-60. Particularly difficult for navigation is the Chalysh-Sharlauk section. In order to maintain guaranteed depths it is important to carry out a great volume of channel work -- bed deepening and straightening. Right now guaranteed depths of 110 cm must be maintained on the Chardzhou-Karatau section and 120 cm between Karatau and the estuary. A serious problem for navigation in the basin is the hauling of barges on the Bara Landing-Uchsay section, where the river fleet

must pass about 25 km along the sea coast, whereby with winds at more than 3, vessels going to Uchsay must wait for calm weather. In the distant future large water diversion from the Amu-Dar'ya at the Kara Kum and Amu-Bukhara canals will make navigation difficult along the river and Sea of Aral. Therefore, for the development of the Sea of Aral navigation and the Amu-Dar'ya, it is extremely important to solve the problem of maintaining the water level in them. The expansion of land under cultivation along the lower Amu-Dar'ya, Chardzhouskaya Oblast and the farming of the Karshi Steppe will lead to an increase in irrigated farm lands. This will require removal of large amount of water from the river. In the future the Syr-Dar'ya will continue to be used for irrigation. As a result of building the Kayrakkum and Farkhad dams a decrease in waterflow to the Sea of Aral from the Syr-Dar'ya has already begun. This decrease will continue as a result of irrigating the Golodnaya Steppe and the imminent construction of the Chardar'ya and Narynskaya dams.

Due to the large amounts of water which have begun to be removed from the Syr- and Amu-Dar'ya, runoff to the sea will decrease greatly. The water level in the sea will drop. A decrease in river runoff in the near future can be represented as follows:[20] 1) Water removal from the Syr-Dar'ya will be 10,6 cu km in the future; 2) From the Amu-Dar'ya to the Kara Kum Canal -- I, II, III units -- 12 cu km; 3) From the Amu-Dar'ya to the Amu-Bukhara Canal, Ist unit, by 1970 -- 4.0 cu km. Between 1959 and 1970 removal of water from the annual Amu-Dar'ya runoff may reach 15 cu km, and the Syr-Dar'ya -- 10.6 cu km. Water removal from the Amu-Dar'ya to the Kara Kum[21] and Amu-Bukhara Canal would decrease river depths. This will have a negative effect on navigation and will require fleet modernization and channel dredging operations on a large scale. Water diversion from the Amu-Dar'ya will make large volume freight shipments difficult, particularly in mixed rail-water service via Aral'sk. In our opinion the Amu-Dar'ya will be used for hauling freight within the Central Asian basin and will be quite important in the economy of the basin, as well as in the organization of mixed rail-water shipments. Navigation on the Syr-Dar'ya is not important in the republic's economy. In 1959 the volume of freight shipments on the Syr-Dar'ya totalled 31,500 tons, and passenger service was much less. The fleet consists of four self-propelled and five tug-drawn units.[22] Republic river transport, in view of the closed nature of the river basins and large amounts of water removed from the Amu- and Syr-Dar'ya as well as the construction of dams, will play an important part in intraoblast and interoblast goods shipments. During the rapid development of the economy

air transport will offer passenger service, as is provided in the plan figures for the development of the USSR national economy for 1959-1965. Further addition to the air fleet of high speed large-capacity planes will make it possible to cut air fares for passenger service and greatly increase the volume of such service. During the Seven Year Plan air transportation will develop even more rapidly in the USSR as a whole and in our republic in particular. During the first year of the Seven Year Plan, that is in 1959, the Nukus-Krasnovodsk line began operations. Formerly two days were required to fly from Nukus to Moscow, now six hours: in Krasnovodsk passengers are transfered to a TU-104B jet airliner, making the Krasnovodsk-Moscow run. The capital of our republic is becoming a major center for jet passenger traffic. In the first year of the Seven Year Plan four daily TU-104 flights were introduced on the Tashkent-Moscow run. These planes will also make four flights a day between Tashkent and Tbilisi. Three times a week high-speed planes fly between Tashkent and Novosibirsk. TU-104B flights, accomodating 100 passengers, are being inaugurated between Tashkent and Alma-Ata. Here the air ticket does not cost more than a rail ticket.

The first year of the Seven Year Plan was set off by the building of the fast TU-114 turboprop plane. It has no equal anywhere in the world for passenger capacity, cargo capacity and cruising range. This new plane is extremely economical. It is designed for carrying passengers, mail and baggage on domestic and intercontinental routes. During the first years of the Seven Year Plan the Central Asian civil air fleet will receive new planes, particularly IL-18 turboprop planes, which operate on the Tashkent-Baku, Alma-Ata-Tashkent-Adler routes, etc. In 1965 the republic's airports will handle seven times as many passengers as in 1958. Cargo volume will also increase. During the Seven Year Plan the helicopter will be used extensively in the republic's economy. The MI-6 helicopter is unequalled throughout the world. It can carry 60-70 passengers, can be used for transfering motor vehicles, tractors, cotton harvesting machinery, scrapers and other equipment. In the near future the cost per passenger-km in the 12-passenger turboprop helicopter, according to Velizhev, can be cut in two in comparison with the Pobeda car. The use of helicopters for carrying passengers, particularly from oblast to rayon seats, will greatly improve both production and operations links. Such a feature of helicopters requires their use for carrying passengers in suburban and local service. This will lighten the load on rail transport. At present many airports in the republic have dirt runways, which makes it impossible for

planes to land and take off during atmospheric precipitation. The temporary shutdown of air operations cannot but exert a negative influence on the productive activities of regions, particularly remote ones. In addition, the organization of freight and passenger service between oblast and rayon seats during poor weather involves great difficultires and inconveniences. Often bad weather is the cause of temporary shutdown of bus and truck service. The rapidity in carrying passengers to their destination, low cost, independence of the conditions of roads and airports, convenience for passengers -- all of these qualities are possessed by helicopters, which link all areas in the republic. At the beginning of 1960 regular helicopter service was begun between Tashkent and Bostandykskiy Rayon, Tashkent-Kdlovan (the Farkhad Sovkhoz). It is necessary to inaugurate air service in each oblast along the following lines: Tashkent-Angren, Tashkent-Yangiyer, Samarkand-Farish, Samarkand-Dzhizak, Urgench-Khiva, Nukus-Khodzheyli, etc. Helicopters are so economical that they can be used as air taxis in large cities. The importance of air transport in the republic's economy during the Seven Year Plan will increase greatly, and it will become one of the primary forms of local passenger service.

Pipelines have a great future. Pipelines have been laid exclusively in the Fergana Valley, where oil is produced and there are two refineries -- the Fergana and Vannovskiy. The main oil pipeline, Assake-Vannovskaya (76)km) and the Mayli-Suassake (76.5 km) and Khartum-Kharabek (14 km) leadins constitutes the republic's pipeline transport facilities. Crude oil is pumped through these lines from the oilfields to the refineries. The volume is not large.

The present level of the development of industry, transport and agriculture, as well as automation and mechanization of production processes, are unthinkable without the extensive application of clear and black petroleum products, since the growing requirements in all branches of the economy, of motors, machine tools and all types of machinery for lubricants and oils are satisfied with products obtained from petroleum and the products of its refining. Technical progress in all branches of the economy involves a sharp increase in the production of motors and machinery. The radical technical reconstruction of transport, achieved during the Seven Year Plan, requires an increase in gasoline, diesel fuel and jet fuel production. Without extensive total mechanization it will be impossible to produce 3.8 million tons of raw cotton in 1965. Seeding machines, cultivators, tractors, cotton harvesting machinery and other equipment, as well as all types of motors used in irrigation operations and pumping stations require an increase in diesel fuel production

and other petroleum products. The farming of the Karshi Steppe will also require an increase in petroleum product production, since bulldozers, excavators, graders and other equipment operate on petroleum products. In order to satisfy the requirements of industry, transport and agriculture in 1959-1965, republic oil refining will increase by more than 130% in comparison with 1958. The development of pipelines in the republic is also required by the gas industry. The basis of the development of the gas and chemical industries, as well as the laying of gas lines in the republic, is the Bukhara gas fields, which are the largest in the USSR. In recent years six gas fields have been discovered in the republic -- Dzharkak, Karaulbazar, Sarytash, Setelantepe, Gazli and Southern Mubarek. The republic contains three geological gas and oil areas: Bukhara-Khiva, Fergana and Surkhandar'ya. The gas pipeline system is developing rapidly (Table 42).

It is clear from Table 42 that in three years more than 800 km of gas pipelines were laid in the republic, the network of which will grow significantly in the future. During the Seven Year Plan industrial enterprises are being shifted to gas. By 1 January 1961 78 industrial enterprises in the republic had been shifted to gas, which has a number of advantages over coal: high calory content -- 10,000 large calories per cu m (coal -- 5450 per kg), more transportable, more convenient for combustion -- produces no ash, smoke, dust. The economic effectiveness of gas as a fuel, in comparison with coal, consists also in the fact that the cost of extractin 1000 cu m of gas at the Dzharkak fields is 0.61 rubles, while the cost of extracting one ton of coal in Angren is 6.20 rubles. Labor expended for extracting 1000 cu m of gas (rated at conditional fuel) is more than 20 times less than labor expended for extracting coal. In addition, a major advantage of gas over coal is the fact that capital investment necessary for prospecting, extraction, and transport, building warehouses, etc., exceeds capital investment in extracting natural gas by more than 100%. Tremendous reserves of natural gas and high technical-economic indices of its utilization make imperative the extensive gasification of industry, agriculture and municipal-communal units. The economic effectiveness of replaceing coal by gas should be determined proceeding from the interests of the economy. In determining the profitableness of shifting from coal to gas at existing plants and combines, in our opinion it is essential to compare the following economic indices: a) cost of coal and gas extraction; b) labor expenditure for extraction of coal and gas; c) capital investment in extracting (including geological survey and prospecting work) and transport industry; d) costs of coal storage; e) fuel consumption nec-

Table 42

Pipelines in 1958-1960

a Газопроводы	h Год вступления в эксплуатацию	i Протяженность, км	j Диаметр труб, мм	k Мощность, тыс. м³
b Ходжиабад — Фергана	1958	81	10,8	650
c Северный Сох — Фергана	1959	68	8	600
d Северный Сох — Коканд	1960	31	8	200
e Хартум — Ходжиабад	1960	св.	нет	
f н п Андижан — г. Андижан	1960	11	10	250
g Джаркак — Ташкент	1960	625	720	4,5 млрд. м³.

Legend: a -- gas pipelines b -- Khodzhiabad-Fergana c -- Severnyy Sokh-Fergana d -- Severnyy-kokand e -- Khartum-Khodzhiabad f -- Andizhan village-Andizhan city g -- Dzharkak-Tashkent h ---year of first operation i -- length, km j -- pipe diameter, mm k -- capacity, thousand cu m l -- billion

essary for hauling coal and gas; f) time spent in transporting coal and gas; g) increase in the production capacity of industrial enterprises. Proceeding from these economic indices we can determine the economic effectiveness of shifting industrial enterprises to gas. The transfer of industrial enterprises to gas will provide great savings to the economy. The economic effectiveness of gasification of industrial enterprises consists in increasing the production capacity of enterprises and savings in expenditures. In determining the economic effectiveness of shifting industrial enterprises, it is essential to consider the one-time savings obtained through eliminating a number of expenses, and savings in annual operating expenses. The one-time savings are obtained through the following: a) cutting down the number of freight cars engaged in coal hauling operations; b) cutting down the number of locomotives hauling coal; c) cutting down expenses for loading and unloading coal; d) cutting down expenses in urban coal deliveries; e) cutting down capital investment re-

quired for building coal storage facilities; f) cutting down the amount of wages for workers employed at coal sheds; g) lightening the load on railroad sections, due to which it is possible to run a greater number of trains without additional capital investment for increasing the traffic capacity of various rail sections. Due to a decrease in the volume of coal hauling switching operations at large stations will decrease, which will to a great extent make it possible to handle the increasing volume of shipments without additional capital investment necessary for adding to sidings at stations and developing switching facilities. In addition, we must consider that the transfer of industrial enterprises to gas aids in increasing their production capacity. A shift of the Chirchik Electrochemical Combine to natural gas will increase mineral fertilizer production by approximately 20%, cut electric power consumption by more than half and decrease the cost of fertilizer by 20-25%. Annual savings in operating costs are obtained throught the low cost of transfering gas by pipeline.

The presence of tremendous reserves of cheap natural gas and its advantages over other types of fuel, the transfer of industrial enterprises to natural gas, the gasification of communal-household needs and of agriculture makes a great development of gas pipelines in the republic essential. During the Seven Year Plan alone 6700 km of lines are to be laid in the republic. In 1958 construction began on a 625 km main with a 720 mm diameter from Dzharkak-Samarkand-Tashkent, completed in January 1961. This was the first main line gas pipeline in the republic. In 1961 the Gazli-Kagan line will be laid, which, hooked up to the Dzharkak-Tashkent line, will increase the capacity of the latter. In 1961 construction is to begin on a gas main with 1020 mm diameter pipes between Gazli and Chelyabinsk, and in 1963 -- Gazli-Sverdlovsk; completion of the former is slated for 1963, and for the latter -- 1965. On the Lower Amu-Dar'ya lead-off lines will be laid from these mains. Uzbek gas will be sent to neighboring republics. The Dzharkak-Tashkent gas main will be extended to Alma-Ata via Frunze. During the Seven Year Plan gas lines will be laid in the Fergana Valley also. Construction has already been completed on gas lines from the Severnyy Sokh beds to Fergana, Kokand, as well as from Fergana to the Kuvasay Cement Plant. The Dzharkak-Tashkent main is to be hooked up to the Izbaskent-Fergana-Ursat'yevskaya pipeline, which will make it possible to create a single gas line network in the republic and effect a circular network of gas mains. In 1965-1967 a gas main is to be built from the Mubarek gas deposit to Tashkent, with a lead-off to Stalinabad. Due to the development of gas lines all large

cities in the republic will receive natural gas, which will make it possible to shift industrial cities to gas. However, this does not completely solve the problem of shifting the republic's economy to gas. It is necessary to introduce gas to agriculture. Therefore, in solving the problem of the necessity of building gas mains from gas deposits to industrial regions it is imperative to consider the requirements of adjoining farm regions for gas. Proceeding not only from the requirements of industrial cities but considering the needs of farming regions for gas, it is essential to select a pipe diameter and determine the capacity of compressor pump stations. For gasification of rayon seats and villages it is advisable to lay lead-off pipelines from gas mains of 300-400 mm diameter thin-walled pipe. For example, from the Dzharkak-Tashkent main lead-off pipes should be laid to the rayon seats of Payaryk, Zaamin, Dzhizak and others. This naturally will require an increased capacity of compressor pump stations. Gas in these regions will be used primarily for satisfying communal-household needs, drying raw cotton, for existing small industrial enterprises, etc.

The economic effectiveness of gas utilization for communal and household needs consists in the fact that the efficiency of gas ranges greatly exceeds that of household stoves, primus stoves, etc., using other fuels. Gasification is of great social importance. The experience of other regions in the country indicates that supply of gas to the public constitutes a major factor in easing household chores, making it possible to save time for cultural pursuits. For continuous supply and decrease in the seasonal nature of gas supply to large industrial centers -- Tashkent, Samarkand, Fergana, Andizhan -- it is essential to build underground gas reservoirs. The creation of a single gas transport system in the republic on the basis of gasification of the economy and construction of underground gas tanks will make it possible to improve maneuverability in distributing gas to consumers and provide synchronization of gas lines and gas fields. Calculations indicate that at least 13,000 km of gas lines should be built for supplying the republic's economy (including rural areas). Gas pipelines have a number of advantages over other forms of transport: a) the possibility of building pipelines by the shortest route. This will make it possible to decrease the volume of transport operations; b) continuous operation under all climatic conditions; c) low operating expenses; d) possibility of maximum automation and mechanization of the transport process; e) high degree of hermetization and extremely low loss ratio; f) decreased metal consumption, labor, fuel and capital investment for gas lines. Capital investment for gas lines is paid off in a short period of time,

since pipelines produce tremendous savings in the economy. Below we include economic indices of gas pipelines. According to figures by the Central Scientific Research Institute of Rail Transport[23] capital investment in rail oil shipments (including expenditures for increasing the traffic capacity and rolling stock) is calculated at 7.3-8.0 per t/km, for gas lines -- 4.6 k per thousand cu m. The cost of shipping 1000 cu m of natural gas by 700 mm gas line 500 km is 1.2 rubles[24], while the cost of shipping an equal amount of Angren coal[25] on the Tashkent Road the same distance is 3.36 rubles. In pipelines metal consumption per km averages 80-130 t, or 10-40 g per t/km and by rail an extra 10-20 g per t/km. Metal consumption for building gas pipelines will be decreased throught the use of thin-walled pipe with a diameter of up to 1020 mm, which will greatly increase their capacity. Consequently, gas pipelines have a number of advantages over other forms of transport and they have a fine future in our republic.

It follows from the above that the interests of developing industry and agriculture require the radical technical reconstruction of transport and the construction of new railroads on routes from Uzbekistan and Kazakhstan, as well as in the republic itself. The extensive use of diesel locomotives on main line and switching operations, the laying of second tracks and heavy rails, the building of mechanized loading facilities and container areas, the development of refrigeration facilities and maximum mechanization of heavy and labor-consuming jobs will make it possible to cut shipping costs in the economy. The development and reconstruction of the road system, considering an increase in motor vehicle transport, passenger and freight service will supply the requirements of the economy for motor vehicle transport. The necessity of centralized shipping for a wide range of goods on the basis of a further amalgamation of small motor pools, the need for an improved specialization in truck use, as well as amalgamation of motor vehicle repair facilities are dictated by a great increase in motor vehicle transport. The addition of modern aircraft and helicopters on the one hand and a continually rising standard of living on the other make air transport a popular means of passenger service. The rapid development of industry and agriculture are furthered by gasification of the economy. The laying of gas pipelines, the total length of these lines and their capacity should satisfy the requirements of the economy for this type of fuel.

CONCLUSION

Transport plays a great role in the Uzbek economy. The rapid growth of industry and agriculture was accompanied not only by the development of transport, but by an increase in freight and passenger volume. During the period of restoration transport was that branch of the economy the restoration of which was an essential condition for developing industry and agriculture, while during the pre-war five year plans it became one of the deciding factors in creating a material-technical basis for socialism in the republic. The formation of a material-technical basis for socialism, industrialization and collectivization of the country, reconstruction of the national economy, creation and development of new branches of industry -- ferrous and non-ferrous metallurgy, machine-building, power engineering, the development of light industry, the processing and extracting industries, 100% literacy -- all required the establishment of solid and reliable transport ties between the republic and the highly-developed regions of the country, importation to Uzbekistan of large quantities of industrial goods -- coal and coke, ferrous metals, motor vehicles, machine tools, industrial equipment, lumber and petroleum products, highly skilled workers, textile and farm machinery, etc. The creation of the material-technical basis for socialism required the great development of rail, motor vehicle, river and air transport. This caused a necessity for rebuilding rail and river transport in the republic and the creation of formerly non-existant motor vehicle and air transport. New railroads and second tracks built during the course of socialist construction, the reconstruction of already existing roads, the radical improvement of the road system, the development of river and air transport in Uzbekistan, the laying of oil pipelines made it possible to develop major industrial centers and bring new regions into socialist construction. Transport aided in farming new areas, raising the standard of living, played a great role in establishing firm economic ties between city and country, industry and agriculture and, finally, aided in raising the standard of living of the Uzbek nation.

During the period of restoration and the further development of the economy transport handled a great volume of shipping. Shipping on the Tashkent Railroad between 1940 and 1950 increased 170%, in trucking -- 1920%. Such an increase in freight turnover is possible due to the highly developed industry and agriculture, rail and truck transport,

furnished with modern, progressive equipment. The planned and proportional development of industry and agriculture in the republic required the complex development of all types of transport. In Uzbekistan the development of all types of transport fills the needs of the economy for shipping without interruption. Although we have achieved great success in developing transport in Uzbekistan, continually developing industry and agriculture require the further development of the transport network. The lower Amu-Dar'ya needs a bridge across the river near Nukus, Dzhumurtau-Tashauz, Nukus-Chimbay-Sultan-Uiz-Dag Rail Lines, the reconstruction of the existing road system and the building of new roads. The southwest of the republicis poorly developed in a transport respect. An increase in railroad construction in this region is dictated by the farming of the Karshi. Steppe, the requirements for the development of new oil fields and other mineral deposits, the working of large stone quarries, in the exploitation of which the neighboring Tadzhik and Turkmen republics are interested. Rail transport in Uzbekistan will be furnished new equipment for maximum satisfaction of the requirements of the economy for shipping during the period of the stepped-up building of communism. At the large freight yards Tashkent-Freight and Kokand it is essential to build mechanized sloping freightyards equipped with electric switch centralization, the laying of a second track on the Kagan-Ursat'yevskaya, Ursat'yevskaya-Kokand, Kzyltukumachi-Angren sections, the installation of automatic block systems on many sections, as well as semi-automatic block systems, the laying of ferroconcrete ties and sturdy rails, the building of mechanized freight operations areas and freight storage areas, etc.

The skeleton of the existing railroad system was built at the end of the 19th-beginning of the 20th century, when freight and passenger service was on a small scale. Industry and agriculture were not yet developed, and many regions in the republic were little inhabited. Due to the rapid development of productive forces shipping has increased greatly, and existing rail routes to the European part of the USSR and Kazakhstan were insufficient. A forecast of the development of productive forces in the USSR as a whole and the eastern areas in particular points out that freight shipments will increase greatly. This brings home hard the problem of the necessity of building new railroads on routes from Uzbekistan to the European part of the USSR and Kazakhstan. The importance of trucking during the period of the stepped-up building of Communism has grown sharply. The development of the chemical and gas industry, electric power engineering and the petroleum industry, cotton farming and farm machine building,

the great scope of housing, communal, irrigation and industrial construction require that large quantities of goods be hauled by trucks. The interests of the development of the economy of Uzbekistan require the amalgamation of small motor pools, the addition of large and small trucks, the extensive application of centralized shipping operations, specialization in vehicles, development of repair facilities, extension of the first-class railroad system, etc. During the all-out building of Communism air transport throughout the republic will be developed significantly. Long-distance passenger service will be handled by comfortable, fast, large-capacity passenger planes, the IL-14 in local service and helicopters in suburban service. The furnishing of new equipment and building of new roads will aid in cutting transport costs in the national economy and will aid in accelerating the rate of the all-out building of Communism.

FOOTNOTES

Introduction

1. Lenin, V. I., Sochineniya (Works), Vol 27, page 277.

Chapter One

2. Central State Archives of the Uzbek SSR, Fund I-9, List 1, Report 2888, pages 32-36.
3. Transport i svyaz' SSSR (USSR Transport and Communications), Statistical compendium, Gosstatizdat, Moscow, 1957, page 67.
4. The Tashkent Railroad totalled 26 km in Uzbekistan, and therefore its freight operations are not characteristic for Uzbekistan.
5. Central..., op. cit., F. I-9, L. 1, R. 66, pp 72-81.
6. Narodnoye khozyaystvo Sredney Azii (Economy of Central Asia), August-September 1926, page 108.
7. Central... op. cit., R. 59, page 171.
8. Frunze, M. V., Na frontakh grazhdanskoy voyny (At the Civil War Fronts), collection of documents, Voyenizdat, 1941, pages 209,211.
9. Lenin, V. I. o Sredney Azii i Uzbekistane (Lenin on Central Asia and Uzbekistan), Tashkent, 1957, page 99.
10. Archives of the CC of the Communist Party of Uzbekistan, F. 60, L. 1, R. 761, page 41.
11. Central..., op. cit., R. 2890, page 34.
12. Lenin, Sochineniya, op. cit., Vol 32, page 260.
13. Nar...., op. cit., 1927, No 10-12.
14. Central..., op. cit., R. 2890, page 34.
15. ibid, R. 2898, page 14.
16. ibid, R. 3005, page 18.
17. Uzbekistan za XV let (Fifteen Years of Uzbekistan), Tashkent, 1939, page 62.
18. Central..., op. cit., R. 2890, page 41.
19. Four kayuk artels existed: the Kerkinskiy, Leninskiy, Karakalpakskiy (Turtkul'skiy) and Khorezmskiy kayuk unions.
20. Central..., op. cit., R. 2890, page 38.
21. ibid., R. 2916, page 47.
22. ibid, pages 47-48.
23. ibid, page 90.

Chapter Two

1. Transport..., op. cit., page 67.

2. Zheleznyye dorogi Sredney Azii (Railroads of Central Asia), Tashkent, 1933, page 9.
3. ibid, page 14.
4. ibid, page 11.
5. ibid, page 13.
6. Marx, K., K kritike politicheskoy ekonomii (Criticism of Political Economy), Gospolitizdat, 1949, page 202.
7. Uzbekistan za..., op. cit., page 62.
8. Central..., op. cit., R. 2920, pages 133-134.
9. Uzbeki..., op. cit., page 62.
10. In addition to the Amu-Dar'ya, there was some, very little, navigation on the Syr-Dar'ya.
11. Problema transportnoy svyazi Khorezmskogo oazisa (The Problem of Transport to the Khorezm Oasis), Gosplan Uzbek SSR publication, Tashkent, 1935, pages 76-78.
12. ibid, page 80.
13. Uz..., op. cit., page 61.

Chapter Three

1. Narodnoye khozyaystvo Uzbekskoy SSR v 1958 godu (Economy of the Uzbek SSR in 1958), Statistical compendium, Tashkent, 1959, page 130.
2. Figures from the Tashkent Railroad Track Maintenance.
3. ibid.
4. Narodnoye khozyaystvo Uzbekskoy SSR (Economy of the Uzbek SSR), Statistical Compendium, Gosstatizdat, Tashkent, 1957, page 130.
5. Transport..., op. cit., page 67.
6. Uzbek..., op. cit., page 62.
7. ibid.
8. Transport..., op. cit., page 159.
9. ibid.
10. ibid., page 176.
11. Figures from Central Asian Steamship Lines.
12. Uzbek..., op. cit., page 61.
13. ibid.

Chapter Four

1. Figures of the Accounting Section of the Tashkent RR.
2. Figures of Tashkent Railroad Track Maintenance.
3. Figures of Tashkent Railroad Planning-economic Section.
4. Figures of Planning-economic Section, Ministry of Motor Transport and Roads Uzbek SSR.
5. ibid.

6. ibid.
7. Figures of the Planning-economic section of MMTaR UzSSR.
8. Transport..., op. cit., page 199.
9. Figures of MMTaR UzSSR.

Chapter Five

1. Khodzhayev, S. M., "Industry and Transport along the Lower Reaches of the Amu-Dar'ya, in the compendium Materialy po izucheniyu proizvoditel'nykh sil Uzbekistana (Study of the Productive Forces of Uzbekistan), ed. 12, Tashkent, AS UzSSR Publishing House.
2. Khodzhayev, "More Efficient Shipment of Building Materials", Izvestiya of the Academy of Sciences UzSSR, Social Sciences Series, AS UzSSR Publishers, Tashkent, 1957, No 1, pages 61-63.
3. Figures of Tashkent Railroad Tashkent Freight Station.
4. Cash indices shown in new prices.
5. Figures of Central Statistical Administration of UzSSR Council of Ministers.
6. ibid.
7. Figures of Central Asia State Steamship Lines.
8. Only part of the route Chardzhou-Ursat'yevskaya-Arys'-Aral'sk will be lightened.
9. In river transport, costs are 15-20%, independent of traffic.

Chapter Six

1. Metody opredeleniya ekonomicheskoy effektivnosti razlichnykh vidov transporta (Methods of Determining the Efficiency of Various Methods of Transport), Part I, Transzheldorizdat, Moscow, 1956, page 26.
2. In treating the following indices we used materials by Prof. T. S. Khachaturov, Ekonomika transporta (Transport Economics), Transzheldorizdat, Moscow, 1959.
3. Cost per ton of diesel fuel is 23.6 rubles and per ton of gasoline -- 108 rubles.

Chapter Seven

1. On the average, 30% of harvested raw cotton is sent from kolkhoz fields to cotton mills, and 70% -- to purchase points. After storage and purchase it is trucked to cotton mills.

2. Ekonomika transporta (Transportation Economics), text under the editorship of Prof. S. K. Danilov, Moscow, 1957, page 443.
3. Zheleznodorozhnyy transport (Rail Transport), Moscow, Transzheldorizdat, 1960, No 4, page 64.
4. Khachaturov, T. S., Ekonomika transporta (Transportation Economics), AS USSR Publishing House, Moscow, 1959, page 357.
5. Not all cargoes produce an effect in turnover funds from accelerated shipment.
6. Bardin, I. A. and Shiryayev, P. A., Tret'ya metallurgicheskaya baza SSSR (Third USSR Metallurgical Base), published by Znaniye, Moscow, 1959, page 21.
7. The Southwest of the UzSSR comprises Samarkandskaya, Surkhandar'inskaya and Bukharskaya oblasts.
8. Prob... Khorezm..., op. cit.,
9. Train traffic along the entire section Chardzhou-Kungrad began in October 1960.
10. Zhel. Trans..., op. cit., 1952, No 12.
11. Pravda, 17 July, 1950, No 199 (15323).
12. Considering that the distance from the cargo divide to Ursat'eyvskaya Station is 30 km and there are no steep grades on the line, we consider it feasible to establish economic relations between the Fergana Valley and Europe via Makat.
13. At present 4.7 million tons of lumber are hauled into Central Asia, ½ million tons being of mine shoring timbers, 2.4 million of uncut lumber and 1.8 million of sawed lumber.
14. According to figures by Academician Kh. F. Fazylov, the cost per kwh of power will be 0,1 kop. in the future.
15. Figures of CSA of UzSSR Council of Ministers for 1958.
16. ibid.
17. From the Seven Year Plan for the UzSSR for 1959-1965.
18. The amount of capital repairs is determined by the formula G. V. Kramarenko, proposed in the book Tekhnicheskoye obsluzhivaniya avtomobiley (Servicing Cars and Trucks), Moscow, 1957, pages 312 and 315.
19. Khrushchev, N. S., Report of the CC of the Party to the 22nd Party Congress, published by Pravda, 1956, page 76.
20. Lyubomudrov, A. P., Voprosy gidrotekhniki (Problems of Hydraulic Engineering), Ed. 6, 1957, page 104.
21. Diversion of water from the Amu-Dar'ya into the Kara Kum Canal began in 1959.
22. Chernov, P. N., "Shipping on the Syr-Dar'ya", Problems of Transport Economics", Trudy (Works) of the Tashkent Transport Scientific Research Institute, Tashkent, 1960, Edition XVI, page 118.

23. Gladtsinov, "Economi[illegible] Significance of Pipeline Development", Voprosy Ekonon[illegible]i (Problems of Economics), 1958, No 12, page 74.
24. Albegov, M. M., "Fac[illegible]rs Determining the Economics of Gas Transfer Through [illegible]s Mains", Gazovaya Promyshlennost' (The Gas Industry), [illegible]9, No 10, page 46.
25. One cubic meter of [illegible] is equal to 2.6 kg of Angren coal.

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